SECTION 12

LIMITATIONS AND STANDARDS: DATA SELECTION AND CALCULATION

This section describes the data sources, data selection, data conventions, and statistical methodology used by EPA in calculating the long-term averages, variability factors, and proposed limitations. The proposed effluent limitations and standards[1] for each subcategory and option are based on long-term average effluent values and variability factors that account for variation in treatment performance within a particular treatment technology over time.

Section 12.1 briefly describes the data sources (a more detailed discussion is provided in Section 3) and gives a general overview of EPA's evaluation and selection of facility datasets that are the basis of the proposed limitations. Section 12.2 provides a more detailed discussion of the selection of facility datasets for each subcategory and option. Sections 12.3 and 12.4 describe data substitution and aggregation used in calculating the proposed limitations. Section 12.5 provides a general overview of limitations in terms of EPA's objective, selection of percentiles as their basis, and compliance with final limitations. Section 12.6 provides an overview of the proposed limitations and Section 12.7 describes the calculation of the concentration-based limitations. Section 12.8 describes the conversion of these concentration-based limitations into the proposed production-normalized limitations. Section 12.9 describes the transfers of limitations from one option to another and the few cases where EPA has converted limitations from the 1982 regulations[2] using the revised production-normalized flows. The attachments for Section 12 are provided in Appendix F.

12.1 Overview of Data Selection

To develop the long-term averages, variability factors, and proposed limitations, EPA used wastewater data from facilities with components of the model technology for each subcategory and option. These data were collected from two sources. The first source was EPA's sampling episodes for which data were collected from 1997 to 1999. The second source was self-monitoring data, which were provided by facilities either in response to the detailed, short, or analytical and production follow-up surveys, or in conjunction with EPA site visits or other industry contacts. These data were collected from 1996 to 1998. This section refers to the first source as 'sampling episodes' and the second source as 'self-monitoring episodes.' This section provides a general overview of EPA's review of the data from these two sources and selection of facilities representing each option. For the final rule, EPA intends to further review and possibly revise the data selection methodology.

EPA qualitatively reviewed the data from these two sources and selected episodes to represent each option based on a review of the production processes and treatment technologies in place at each facility. EPA only used data from facilities that had some or all

[1]In the remainder of this chapter, references to 'limitations' includes 'standards.'

[2]In this section, the regulations promulgated in 1982 are referred to as the 1982 regulations.

components of the model technologies for the option (model technologies for each option are described in Section 8). After EPA identified those facilities with components of the model treatment in place for each option, EPA selected facilities that met several other criteria as described in the following paragraphs.

The first criteria was that the influents and effluents from the treatment components had to represent wastewater from that subcategory and option, with no incompatible wastewater from other subcategories or large amounts of noncontact cooling water or stormwater. Typically, facilities may commingle wastewater streams with noncontact cooling water, stormwater, or wastewaters from different subcategories. Application of this criterion resulted in EPA selecting only those facilities where the commingled wastewaters did not result in substantial dilution, more concentrated wastewaters, or wastewaters with different types of pollutants than those generated in the subcategory.

The second criterion was that the facility had to demonstrate good operation of the treatment component, as indicated by pollutant removals across the treatment system and treatment system effluent quality (e.g., datasets for episodes with generally high pollutant concentrations for all pollutants were excluded). EPA made its determinations regarding whether a facility met this criterion based upon site visit reports, survey responses, and the chemical analytical data collected during sampling episodes or obtained as self-monitoring data from the facilities.

A third criterion was that the facility had to demonstrate water usage practices representative of a well-operated system in terms of production-normalized flow rates.[3] These flows were required to be near the model production-normalized flow rate selected for each option (see Section 7 for discussion of flow rates). Such facilities typically practice high-rate recycle (generally 95 percent or greater recycle rate) or other water usage practices (depending on the manufacturing process) geared toward more efficient water use. In contrast, episodes with unusually high production-normalized flow rates were considered to be not representative of other facilities in the subcategory because they did not practice good water usage and, because of dilution, analytical data from these processes may represent lower concentrations than those achievable by facilities using less water.

A fourth criterion was that the data could not represent periods of process or treatment upsets. EPA did not use data from its sampling episodes that were collected during times of production or wastewater treatment shut downs. For self-monitoring data, EPA used facility responses to the survey and contacted the facility when necessary to determine whether data submitted were representative of normal operating conditions.

EPA determined that the datasets from the episodes that met all four criteria demonstrated the best performance. Thus, EPA used these datasets to develop the proposed

[3]These flow rates were the operating conditions during EPA's sampling episodes or as reported in the survey responses.

limitations for each subcategory option. EPA selected some episodes for more than one subcategory because these facilities met the criteria for more than one subcategory.

Generally, if EPA selected data from a sampling episode, it also selected any self-monitoring episode data submitted from the same treatment system from the same facility. EPA's sampling episodes typically provided data for all of the pollutants proposed for regulation (see Section 11). In contrast, the industry self-monitoring data were only for a limited subset of pollutants (most facilities monitor only for pollutants specified in their permits). EPA analyzed the data from each episode separately in calculating the proposed limitations. This is consistent with EPA's practice for other industrial categories. Data from different sources generally characterize different time periods and different chemical analytical methods. EPA's concern in combining data from different time periods is that operating conditions are usually different due to changes such as management, personnel, and procedures.

In developing the proposed limitations, EPA generally used the self-monitoring data when they were measured by analytical methods specified in or approved under 40 CFR Part 136 that facilities are required to use for compliance monitoring. Section 4 describes all but one of the exceptions to this general rule. The remaining exception was EPA's exclusion of all industry self-monitoring data for oil and grease because facilities generally used methods which require freon, an ozone-depleting agent, as an extraction solvent. For the samples collected in its sampling episodes, EPA used a more recent method, Method 1664, which uses normal hexane (*n*-hexane) as the extraction solvent and measures oil and grease (O&G) as hexane extractable material (HEM). While developing Method 1664, EPA received comments about potentially differing results using the new method that could bring a permittee into noncompliance under certain circumstances.[4,5] Although EPA has determined that the methods are comparable and that direct replacement of the new method is warranted, EPA expects that facilities will choose to use Method 1664 rather than the freon methods as freon becomes more expensive and difficult to obtain. Further, EPA has determined that it collected sufficient data to establish the oil and grease limitations using only the HEM data. Thus, EPA has chosen to develop the oil and grease limitations solely on the HEM measurements from Method 1664.

After selecting the EPA sampling and self-monitoring datasets for the best performers, EPA reviewed the pollutant concentrations in each dataset. If an episode's pollutant concentrations for a particular pollutant were substantially higher than for other episodes selected for the option, EPA excluded the data for that pollutant from that episode. EPA also excluded

[4]U.S. Environmental Protection Agency. Approval of EPA Methods 1664, Revision A, and 9071B for Determination of Oil and Grease and Non-polar Material in EPA's Wastewater and Hazardous Waste Programs, EPA-821-F-98-005, February 23, 1999. (Also located at **www.epa.gov/ost/methods/1664fs.html** and DCN IS04884 in Section 3.1 of the proposal record.)

[5]U.S. Environmental Protection Agency. Analytical Method Guidance for EPA Method 1664A Implementation and Use (40 CFR part 136). EPA/821-R-00-003, February 2000. (Also located at http://www.epa.gov/ost/methods/1664guide.pdf.)

outliers within episode datasets when it deemed such exclusions were appropriate. These exclusions, along with justifications, are described in detail in the next section.

12.2 Episode Selection for Each Subcategory and Option

This section describes the data selected for each pollutant for each technology option in each subcategory. This discussion is divided into subparts corresponding to the subcategories and options where EPA is proposing numerical limitations. (See Section 8 for those options for which EPA is proposing *no discharge of process wastewater pollutants to waters of the United States).*

In the following sections and the public record, EPA has masked the identity of the episodes and sample points to protect confidential business information (CBI). EPA sampling episodes are identified as ESExx and the industry self-monitoring episodes as ISMxx where 'xx' is a unique two-digit number assigned to each episode (for example, ESE01 and ISM51). The sample points are identified with SP-c where 'c' is a character (for example, SP-A). The daily data and sample points corresponding to these episodes are listed in Appendix D. Attachment 12-1 in Appendix F provides summary statistics for all episodes, sorted by subcategory and option.

12.2.1 Subpart A: Cokemaking Subcategory

For the By-Product Recovery Segment in the Cokemaking Subcategory,[6] as described in the following subsections, EPA evaluated four options: BAT-3, BAT-1, PSES-1, and PSES-3. The data for the BAT-3 and BAT-1 options were used to calculate the proposed limitations for direct dischargers. The data from the BAT-1 and PSES-1 options were used to calculate the two sets of co-proposed standards for indirect dischargers. (The technical components for BAT-1 are the same as those for PSES-3.)

BAT-3

The proposed BAT-3 option technology is the basis of the proposed limitations for direct dischargers in the By-Product Recovery Segment. This option has an alkaline chlorination component, plus the components of the BAT-1 option (see Section 8 for detailed descriptions of the BAT-3 and BAT-1 model technologies). As described below, of the pollutants proposed for regulation, alkaline chlorination is the relevant technology component for the proposed ammonia as nitrogen, phenol, total cyanide, and total residual chlorine (TRC) limitations. The BAT-1 components are the basis for the proposed limitations for benzo(a)pyrene, O&G, mercury, naphthalene, selenium, TSS, and thiocyanate. (EPA proposed O&G and TSS standards only for new direct dischargers.)

[6]For the Non-recovery Segment in this subcategory, EPA has proposed *no discharge of process wastewater pollutants to waters of the United States* as explained in Section 8.

EPA was only able to identify one facility (episode ISM52) with the alkaline chlorination component. This facility is located in Canada and EPA was unable to obtain the facility's permission to sample its wastewaters (EPA's statutory authority under the Clean Water Act Section 308 to require facilities to produce information does not apply to Canadian mills). The cokemaking wastewater at this facility passed through a biological treatment system and then was commingled with blast furnace ironmaking wastewater. This commingled stream was treated with alkaline chlorination and then mixed with a second stream consisting of wastewaters from the Integrated Steel Subcategory and Carbon and Alloy Steel Segment of the Integrated and Stand-Alone Hot Forming Subcategory. The wastewaters from both streams were commingled and sent through filters before reaching the discharge point, which was the facility's monitoring point. (See Figure 12-1.) Although the cokemaking wastewater was treated by all the components of the BAT-3 model technology, the wastewater was commingled with ironmaking wastewaters that were not treated by the biological treatment component. Because cokemaking and ironmaking contribute some of the same pollutants to the wastewaters, EPA excluded the data for pollutants that were not treated by the alkaline chlorination component of the model technology.

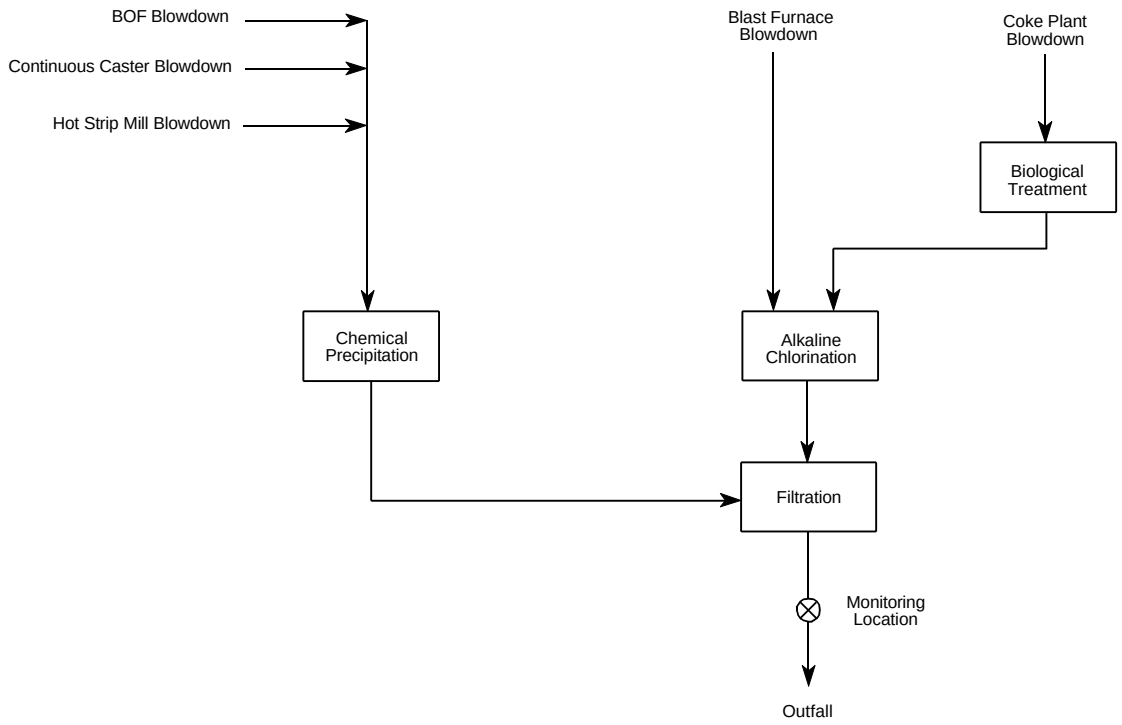

Figure 12-1. Alkaline Chlorination Model Technology Facility

Of the parameters monitored for episode ISM52,[7] only ammonia as nitrogen, total cyanide, and total phenols are treated by alkaline chlorination. For these parameters only, EPA assumed that the entire loading was contributed by cokemaking and blast furnace ironmaking operations. This assumption is supported by facility personnel (DCN IS04112), process chemistry considerations, and EPA sampling data showing that these parameters are not present to a significant degree in the Integrated Steel and Integrated and Stand-Alone Hot Forming Subcategories (DCN 1505030 in Section 5.4 of the proposal record). Because the cokemaking and ironmaking wastewaters were commingled with the second wastestream, the pollutant concentrations were diluted at the monitoring point. The facility provided EPA with the daily flow at the monitoring point, and also provided the blowdown rates of the coke plant and blast furnaces, which remained constant during the self-monitoring episode. EPA used this information in conjunction with the pollutant concentrations to estimate the ammonia as nitrogen, total cyanide, and total phenols[8] concentrations achievable by alkaline chlorination. In its estimation procedure, EPA divided the pollutant concentration at the monitoring point by the ratio of the flow processed in alkaline chlorination to the total effluent flow (DCN 1504933 in Section 5.6 of the proposal record). For example, if the total cyanide concentration is 2 mg/L, the combined flow from cokemaking and blast furnace (flow processed by alkaline chlorination) is 0.5 million gallons per day (mgd), and the flow at the monitoring point is 1 mgd, then the ratio of the two flows is 0.5/1 = 0.5. Then, the estimated concentration corresponding to the flow treated by alkaline chlorination is (2 mg/L)/0.5 = 4 mg/L. Because this estimation is only appropriate for pollutants treated by alkaline chlorination, EPA selected ammonia as nitrogen and total cyanide data from this episode to calculate the proposed BAT-3 limitations. The estimated concentration values are listed in Appendix D.

Of the pollutants that EPA is proposing to regulate for this segment, ammonia as nitrogen, total cyanide, and phenol are the only three treated differently by this technology than by the BAT-1 technology. As discussed above, ammonia as nitrogen and total cyanide were estimated from the data for episode ISM52.[9] Phenol is proposed for regulation instead of total phenols, but data were not available from episode ISM52. Phenol is treated both by the alkaline chlorination and biological treatment components of the model technology. The biological treatment component is also part of the model BAT-1 technology. For phenol, because the

[7]The facility provided its self-monitoring data for ammonia as nitrogen, total cyanide, total phenols, benzene, benzo(a)pyrene, naphthalene, total suspended solids, O&G, lead, and zinc.

[8]EPA is not proposing to regulate total phenols. However, EPA used this estimation procedure for the total phenols data in determining pollutant loadings reductions in Section 10.

[9]EPA excluded all pollutant concentrations for one sampling day that had a reported flow rate three times greater than others in that time period. The facility's treatment system would have had difficulties in treating such a high wastewater volume. (DCN 1504991 in Section 5.6 of the proposal record.) EPA will contact this facility before the final rule to determine the reason for the unusually large flow rate for this day.

BAT-3 technology is more sophisticated than the BAT-1 technology, EPA determined that it was appropriate to transfer the proposed BAT-1 limitation[10] to the BAT-3 option.

Total residual chlorine (TRC) is not treated by the BAT-3 technology, but EPA proposes to regulate TRC to ensure that residual concentrations of chlorine from the alkaline chlorination process are kept to a minimum to avoid effluent toxicity. EPA is proposing that facilities would not need to meet the TRC limitation if they certify to the permitting authority that they do not employ alkaline chlorination in their wastewater treatment. Because EPA did not receive any TRC data from episode ISM52, EPA proposed limitations for TRC based upon the 1982 regulations for the Ironmaking Subcategory. (After adjusting the 1982 mass-based limitations for the production-normalized flows used in 1982, the 1982 limitations are the same on a concentration-basis for both the sintering and ironmaking subcategories.) The 1982 regulations for TRC were based upon model technologies that included a component for alkaline chlorination. EPA determined that the 1982 TRC limitation for ironmaking was based on the alkaline chlorination process itself, and therefore the 1982 limitation from ironmaking would apply to alkaline chlorination performed at cokemaking operations. Thus, EPA used the 1982 regulations from the Ironmaking Subcategory as the basis for the proposed limitations. (Section 12.9 describes the adjustment for differences in production flows between the two subcategories.)

For the remaining pollutants (benzo(a)pyrene, O&G, mercury, naphthalene, selenium, TSS, and thiocyanate) proposed for regulation, EPA transferred the proposed limitations from the BAT-1 option. (As explained previously, EPA excluded the data from episode ISM52 for pollutants other than those treated by the alkaline chlorination component.) EPA determined that these transfers were appropriate because the BAT-1 component of the BAT-3 technology treats these remaining pollutants and the alkaline chlorination component does not provide additional removals of these pollutants.

BAT-1 (PSES-3)

The proposed BAT-1 option technology was used as the basis for the proposed limitations for direct dischargers. The proposed limitations based on the BAT-1 option technology were also used as pretreatment standards for the PSES-3 option, which is based on the same physical, chemical, and biological technology. As mentioned in previous Section 12.2, PSES-3 pretreatment standards were co-proposed with PSES-1 pretreatment standards for physical and chemical technology. The proposed BAT-1 limitations for some pollutants were also transferred to the BAT-3 option, as explained in the previous section.

Based on an evaluation of industry survey responses, EPA determined that all but two of the direct-discharging facilities with processes in the By-Product Recovery Segment have

[10]Phenol was not measured above the detection level in any BAT-1 sample. The long-term average of 10.08 ug/L is an average across sample-specific detection limits for the BAT-1 samples. With one exception, all sample-specific detection limits were equal to 10 ug/L which is also the minimum level for the analytical method. The other sample-specific detection limit was 10.4 ug/L and resulted from a 1.04-fold dilution to correct for a smaller extraction (960 mL) than the 1000 mL specified by the analytical method.

the model technology associated with the BAT-1 option, namely ammonia stripping and biological treatment. Of these facilities, EPA selected data from three facilities that met the criteria described in Section 12.1. These data were from two sampling episodes (ESE01 and ESE02) and two self-monitoring episodes (ISM50 and ISM51). (One sampling episode and self-monitoring episode were from the same facility.) These facilities treat wastewater from by-product recovery operations as well as small amounts of groundwater or control water added for biological treatment optimization. One facility (episode ESE02) had the BAT-1 model technology; however, its performance was uniformly poor as evidenced by high concentration discharges. For this reason, EPA excluded all data except mercury from this episode in calculating the proposed limitations (see discussion below about the mercury data). Where data for a particular pollutant were available from the remaining three episodes, EPA generally included the data in calculating the proposed limitations. However, for episode ISM51, EPA excluded the portion of the dataset corresponding to the time period when the facility was operating a treatment system different from the BAT-1 model technology. In addition, EPA found that episode ISM51 demonstrated poor performance of the model technology for several pollutants and excluded the data for those pollutants from the calculations. For the final rule, EPA intends further review of this episode and its data to determine if the performance should be considered uniformly poor and the data for all pollutants excluded from calculating the limitations.

Thus, data from one to three episodes with the BAT-1 technology were used to develop the proposed limitations for benzo(a)pyrene, mercury, naphthalene, selenium, and thiocyanate. In addition, the data from these episodes were used to calculate the proposed TSS and O&G standards for new direct dischargers. Data from these episodes were also used to calculate the proposed pretreatment standards for ammonia as nitrogen, total cyanide, naphthalene, phenol, selenium, and thiocyanate (because the PSES-3 technology has the same components as the BAT-1 technology). The following paragraphs describe the episodes selected for each pollutant.

For benzo(a)pyrene, EPA had concentration data from its sampling episode (ESE01) and from the two self-monitoring episodes. EPA excluded the benzo(a)pyrene data from one self-monitoring episode (ISM50) because of concerns about the analytical methods (see section 4.4.15, DCNs IS07040 and IS07051 in Sections 8.4 and 8.5 of the proposal record). EPA excluded the data from the other self-monitoring episode (ISM51) because all reported data were associated with a new non-BAT-1 treatment system.

For mercury, EPA had concentration data from one EPA sampling episode (ESE01) and one self-monitoring facility (ISM51). Because the data were all non-detected, variability cannot be calculated (as explained in Appendix E). Thus, EPA included one additional facility (episode ESE02) to develop variability factors for the proposed limitations. EPA excluded this episode from the long-term average calculations because this facility did not operate its treatment systems to the non-detectable levels demonstrated by the other two episodes. However, because episode ESE02 has the BAT-1 technology, EPA concluded that the variability of the wastewaters at this episode would be similar to the variability of well-operated facilities. Thus, this episode was used to calculate variability factors for the proposed mercury limitations.

For naphthalene, EPA had concentration data from one EPA sampling episode (ESE01) and two self-monitoring episodes (ISM50 and ISM51). EPA excluded the data from self-monitoring episode ISM51 because all reported data were associated with a new non-BAT-1 treatment system. EPA calculated the proposed limitations using the data from episode ESE01.

For selenium and thiocyanate, EPA had concentration data from EPA sampling episode ESE01 and self-monitoring episode ISM51. EPA excluded the data from self-monitoring episode ISM51 because all reported data were associated with a new non-BAT-1 treatment system. EPA calculated the proposed limitations for selenium and thiocyanate using the data from episode ESE01.

For the O&G standards proposed for new direct dischargers, EPA used concentration data from its sampling episode (ESE01) for O&G measured as HEM. As explained in Section 12.1, industry did not measure O&G as HEM and thus none of the self-monitoring episodes were included in calculating the proposed O&G standards.

For the TSS standards proposed for new direct dischargers, EPA had concentration data from one sampling episode (ESE01) and two self-monitoring episodes (ISM50 and ISM51). For episode ESE01, EPA excluded two duplicate pairs (samples collected from the same stream at approximately the same time and under approximately the same field conditions) because the results indicated poor precision.[11] (EPA intends to re-evaluate this decision for the final rule.) For episode ISM51, EPA had concentration data corresponding to two chemical analytical methods: 160.2 and 2540D (see section 4.4.3 for a description of these methods). The data from Method 160.2 from that episode were excluded because the average was more than five times higher than either of the other episodes (DCN IS07052 in Section 8.5 of the proposal record). The data from Method 2540D from that episode were excluded because the data represented the new treatment system.

For the ammonia as nitrogen pretreatment standards for the PSES-3 option, EPA had concentration data from one sampling episode and two self-monitoring episodes. EPA proposed pretreatment standards for indirect dischargers using the data from the two self-monitoring episodes. (The proposed limitations for direct dischargers were based upon the BAT-3 option.) EPA excluded data from the sampling episode (ESE01) because the levels were uniformly low at all influent and effluent sampling points in comparison to other BAT-1 episodes. EPA also excluded some ammonia as nitrogen data from one self-monitoring episode (ISM51) because the data represented the facility's new non-BAT-1 treatment system. EPA excluded the data for two days from another self-monitoring episode (ISM50) because the concentration levels of 14.5 and 38.7 mg/L reported for the first two consecutive samples were substantially greater than the data for the remaining 54 sampling days. In addition, these two data values were greatly in excess (about four and ten times, respectively) of concentrations in the following weeks. For the final rule, EPA intends to contact the facility to determine if a particular process condition resulted in these extreme values.

[11]The first pair had values of 78 mg/L and 13 mg/L. The second pair had values of 110 mg/L and 18 mg/L.

For the phenol pretreatment standards, EPA had concentration data from EPA sampling episode ESE01. Industry did not monitor for phenol and thus none of the self-monitoring episodes were included in calculating the proposed phenol pretreatment standards. The industry supplied data were for total recoverable phenolic material ("total phenols") rather than phenol, which is a single organic analyte.

For the total cyanide pretreatment standards, EPA had data from one sampling episode (ESE01) and two self-monitoring episodes (ISM50 and ISM51). EPA proposed pretreatment standards for indirect dischargers using these data. (The proposed limitations for direct dischargers were based upon the BAT-3 option.) EPA excluded some data from episode ISM51 because the data represented the new treatment technology rather than the BAT-1 technology. Of the remaining eight data points from episode ISM51, which were measured with Standard Method 4500, EPA excluded the first six, which were all reported as detected at the same value of 12 mg/L. Because data are seldom reported at the same value unless they are non-detected or very close to the lowest level that can be measured by the chemical analytical method, EPA determined that these data should be excluded because of concerns about the level of precision attained by the laboratory. In addition, EPA excluded the remaining two data values (8 and 8.7 mg/L) which were also measured with Standard Method 4500, because EPA concluded that all results were probably unreliable from this method during the self-monitoring episode.

PSES-1

EPA co-proposed pretreatment standards for indirect dischargers based on the PSES-1 technology (physical and chemical technology) and the PSES-3 technology (physical, chemical, and biological technology which has the same components as the BAT-1 option technology and is described in Section 12.2.1.2.) Eight facilities (corresponding to eight episodes) had the PSES-1 option technology and met the criteria in Section 12.1. Four of these episodes were EPA sampling episodes (ESE01, ESE02, ESE03, and ESE11) and four were self-monitoring episodes (ISM53, ISM54, ISM55, and ISM56). None of the facilities commingled cokemaking wastewater with wastewater from other subcategories. When data were available, EPA used the data from the indirect dischargers (i.e., the self-monitoring episodes) to calculate the proposed PSES-1 pretreatment standards for ammonia as nitrogen, total cyanide, thiocyanate, selenium, naphthalene, and phenol. For the final rule, EPA intends to consider whether self-monitoring episode ISM54 should be excluded because of its unusually high influent wastewater flow (and consequently, high production-normalized flows).

The direct dischargers represented in the four sampling episodes had employed the proposed model technology that was the basis for the proposed pretreatment standards. EPA used their data to calculate the proposed pretreatment standards only when no data were available from the indirect dischargers. For the final rule, EPA intends to reconsider the exclusions of data from three of these episodes (DCN IS07053 in Section 8.5 of the proposal record lists the data and summary statistics for these three episodes). EPA intends to continue to exclude the data from the fourth sampling episode (ESE11) to protect confidential business information (CBI). Because EPA sampled this facility for a single day, it is not possible to adequately aggregate the data for public review while still protecting CBI. While EPA can and has used CBI data in

developing limitations and standards, EPA has determined in this case that sufficient data are available to develop the proposed pretreatment standards without the data from this sampling episode.[12] Thus, EPA intends to continue to exclude the data from developing the pretreatment standards, but EPA will compare these data to the final pretreatment standards to evaluate the facility's treatment performance.

For ammonia as nitrogen, EPA had data from four self-monitoring episodes (ISM53, ISM54, ISM55, and ISM56) at indirect-discharging facilities. EPA excluded data from self-monitoring episode ISM56 because this facility employs biological treatment in addition to ammonia stripping (ammonia stripping is the PSES-1 model treatment technology), and biological treatment provides additional removal of ammonia.

For selenium, the indirect-discharging facilities did not collect any data for this pollutant in their self-monitoring episodes. Therefore, EPA selected one of the three sampling episodes (ESE01) to calculate the PSES-1 pretreatment standards. EPA only chose selenium data from this single episode because the selenium concentrations from each episode were similar. For the final rule, EPA will reconsider the exclusion of the selenium data from the remaining two sampling episodes (see DCN IS07053 in Section 8.5 of the proposal record for summary statistics).

For total cyanide, EPA had data from all four self-monitoring episodes. EPA excluded data from ISM53 and ISM55 because these two facilities employ cyanide precipitation in addition to ammonia stripping; cyanide precipitation is not part of the PSES-1 treatment technology and provides additional removal of total cyanide. For the final rule, EPA will reconsider the exclusion of the total cyanide data from episode ISM54 (see DCN IS07055 in Section 8.5 of the proposal record for summary statistics).

For phenol and thiocyanate, the indirect-discharging facilities did not collect any data for these pollutants in their self-monitoring episodes. Therefore, EPA selected one of the three sampling episodes (ESE03) to calculate the PSES-1 pretreatment standards. EPA excluded the data for thiocyanate and phenol from episode ESE02 because the thiocyanate concentrations from this episode were an order of magnitude less than data from the other sampling episodes and because phenol concentrations were all reported as greater than the highest calibration value of the analysis (200 mg/L). EPA also excluded the data from episode ESE01 because the high concentration levels for thiocyanate and phenol indicated poor treatment for these parameters.

For naphthalene, EPA also used sampling episode ESE03 to develop the proposed pretreatment standards. For the final rule, EPA will reconsider the exclusion of the naphthalene data from sampling episodes ESE01 and ESE02 and self-monitoring episode ISM54 (see DCNs IS07053 and IS07055 for summary statistics). Except for one data point, EPA used all the data from episode ESE03 to calculate the proposed pretreatment standards for naphthalene. EPA

[12]If the facility chooses to waive its CBI claim for the concentration data from this sampling episode, EPA will consider using these data in calculating the final limitations.

excluded one data point (0.018 mg/L) for naphthalene because it was substantially lower than the sample-specific detection limits (both were 0.1 mg/L) in the episode dataset.

12.2.2 Subpart B: Ironmaking Subcategory

The Ironmaking Subcategory has two segments: the Sintering Segment and the Blast Furnace Segment. EPA is proposing limitations for the same pollutants for both B except as noted in the preamble to the proposed rule. EPA used the same concentration data but different production normalized flows for the two segments (see Section 12.8.1). EPA determined that it was appropriate to use the same concentration data for both segments because wastewaters from these two segments are compatible, and all facilities with co-located blast furnaces and sinter plants co-treat the wastewaters from each operation.

Using the criteria in Section 12.1, EPA selected data from facilities with high-rate recycle and the relevant portions of the model technology for each pollutant. As described in the following subsections, EPA evaluated two options: BAT-1 and PSES-1. The data for the first option were used to calculate the proposed limitations for direct dischargers, and data for the second option were used to calculate the proposed pretreatment standards for indirect dischargers.

BAT-1

The proposed BAT-1 option technology is the basis of the proposed limitations for the direct dischargers in the Ironmaking Subcategory; EPA identified one facility with all of the model technologies in place. However, data submissions from this episode indicated that the facility was not operating its treatment system effectively, and several EPA attempts to inquire about process conditions at the facility went unanswered. Thus, EPA excluded data from this facility for this option (DCN 1504992 in Section 5.6 of the proposal record). Instead, EPA used data from other sources in calculating the proposed limitations for ammonia as nitrogen, total cyanide, lead, zinc, O&G, 2,3,7,8-tetrachlorodibenzo-furan (2,3,7,8-TCDF), phenol, TRC, and TSS as described in the following paragraphs. (EPA proposed O&G and TSS standards only for new direct dischargers.)

For ammonia as nitrogen and total cyanide, EPA selected episode ISM52 as the model facility for this option. Although the data from episode ISM52 are from effluent from commingled wastewaters for cokemaking, blast furnace ironmaking, integrated steel, and integrated and stand-alone hot forming subcategories (see Figure 12-1 and description in Section 12.2.1.1), EPA has determined that the pollutant concentrations for ammonia as nitrogen and total cyanide are representative of ironmaking wastewaters (for both sintering and blast furnaces) because the alkaline chlorination component of the model technology treats only ammonia as nitrogen, total cyanide, and phenol. As explained in Section 12.2.1.1, EPA used the daily flow at the monitoring point, the blowdown rates of the coke plant and blast furnaces, and pollutant concentrations to estimate the ammonia as nitrogen and total cyanide concentrations achievable

by alkaline chlorination[13] (which is one of the components of the model technology for this subcategory).[14] While phenol is also treated by alkaline chlorination, industry did not supply any data for phenol. In calculating the proposed limitations, EPA used the phenol long-term average from two options in the 1982 rulemaking that included components for alkaline chlorination. This long-term average (0.01 mg/L) was the same for both the sintering and ironmaking subcategories for the 1982 rule. (This value corresponds to sintering option BAT-3 on page 402 and ironmaking option BAT-4 on page 406 in Appendix C of Volume I of the 1982 Development Document).

TRC is not treated by the BAT-1 technology, but EPA proposes to regulate TRC to ensure residual concentrations of chlorine are kept to a minimum to avoid effluent toxicity. (EPA is proposing that facilities would not need to meet the TRC limitation if they certify to the permitting authority that they do not employ alkaline chlorination in their wastewater treatment). Because EPA did not receive any TRC data from industry, EPA proposed limitations for TRC based upon the 1982 regulations for the 1982 Ironmaking Subcategory. (After adjusting the 1982 mass-based limitations for the production-normalized flows used in 1982, the limitations are the same on a concentration-basis for the sintering and ironmaking subcategories.) The 1982 regulations for TRC were based upon model technologies that included a component for alkaline chlorination. Thus, EPA used the 1982 regulations from the Ironmaking Subcategory as the basis for the proposed limitations (Section 12.9 describes the adjustment for differences in production flows between the two subcategories.)

For lead and zinc, EPA excluded the data from episode ISM52 because the commingled streams all contribute to the pollutant concentrations (as explained in Section 12.2.1.1). Thus, EPA used blast furnace ironmaking data from another self-monitoring episode (ISM61) that did not have the alkaline chlorination component of the model technology. This is a reasonable substitution because this episode only had the metals precipitation and filtration components; alkaline chlorination does not provide any additional removals of the metals.

For O&G, which is proposed for new direct dischargers, industry did not measure O&G as HEM (see Section 12.1), and the standards for this option were calculated using O&G data measured as HEM in a sampling episode that demonstrated the PSES-1 option technology (for further discussion of the O&G data, see Section 12.2.2.2). EPA concluded that transfer of these data are appropriate given that the technology basis for BAT-1 includes additional treatment steps and should provide better removals than PSES-1. As such, EPA expects that facilities utilizing the BAT-1 technologies can achieve O&G effluent concentration levels at least as low as the values from facilities using the PSES-1 technologies.

[13]EPA also used this estimation procedure for the total phenols data in determining the pollutant loadings reductions in Section 10.

[14]Also as explained in Section 12.2.1.1, EPA excluded all pollutant concentrations for one sampling day with a high flow rate.

For 2,3,7,8-TCDF, which is proposed for sintering wastewater only, EPA did not receive any data from the industry for the BAT-1 option technology. However, EPA collected data for the PSES-1 option technology, and the limitations for this option were transferred from the PSES-1 option (for further discussion of the 2,3,7,8-TCDF data, see Section 12.2.2.2). The PSES-1 technology is identical to BAT-1 except that PSES-1 does not include alkaline chlorination; EPA determined that this limitations transfer is appropriate because alkaline chlorination does not provide treatment for 2,3,7,8-TCDF.

For TSS, industry did not provide any data from the BAT-1 model technology. The 1982 regulations for TSS for new sources that are direct dischargers are based upon a technology similar to BAT-1. After adjusting for differences in production-normalized flows for each subcategory, the 1982 regulations for the ironmaking and sintering subcategories are the same on a concentration basis. Thus, EPA has transferred the 1982 TSS regulations for new sources that are direct dischargers as the basis for the proposed standards. (Section 12.9 describes the adjustment for differences in the proposed production flows for this subcategory.)

PSES-1

The proposed PSES-1 option technology is the basis of the proposed pretreatment standards for the indirect dischargers in the Ironmaking Subcategory. EPA selected one facility (corresponding to two episodes) as the best performer for this option. This facility commingles blast furnace ironmaking and sintering wastewaters. EPA had final effluent data from its sampling episode ESE08 and self-monitoring episode ISM62 supplied by the facility. EPA determined that these data represent the pollutant concentrations for this subcategory because both processes in the subcategory are represented.

For lead, zinc, and ammonia as nitrogen, EPA used the data from both episodes to calculate the proposed pretreatment standards. None of the data were excluded.

For 2,3,7,8-TCDF, EPA has proposed a daily maximum pretreatment standard that applies only to sintering wastewater. EPA proposes to require compliance monitoring at internal outfalls before any non-process or additional process wastewaters other than blast furnace wastewater flows are combined with the sinter plant wastewater. This proposed 2,3,7,8-TCDF pretreatment standard is based upon data from treated effluent from commingled sintering and blast furnace wastestreams from sampling episode ESE08. (During this sampling episode, EPA did not collect samples of treated sintering wastewater.) These data were all reported at non-detected concentration levels of 2,3,7,8-TCDF. EPA also collected data in a sampling episode at a facility that had sintering operations only. At this facility, EPA found detected concentrations of 2,3,7,8-TCDF in the treated effluent (these concentrations are listed in DCN 1500490 in Section 4.4 of the proposal record). However, EPA has excluded these data because the facility did not have the model treatment technology in place. EPA expects to gather additional information on dioxin and furan concentrations in sinter plant-only effluent and on the regulatory approach through the public comment process.

While EPA is not proposing pretreatment standards for O&G, EPA is transferring the standards calculated from the O&G data measured as HEM from this proposed option to BAT-1 (see Section 12.2.2.1). These proposed standards are for new direct dischargers. Industry did not provide any O&G data measured as HEM (see Section 12.1). Thus, EPA used the O&G data measured as HEM from sampling episode ESE08 to calculate the proposed standards for O&G for BAT-1.

12.2.3 Subpart C: Integrated Steelmaking Subcategory

For the Integrated Steelmaking Subcategory, EPA is calculating the proposed limitations for direct dischargers and indirect dischargers using data from the BAT-1 option for three general processes: basic oxygen furnaces (wet-open combustion), vacuum degassing, and continuous casting. (The technology components are the same for the BAT-1 and PSES-1 options.) For the BAT-1 option in this subcategory, EPA selected effluent data from one facility (corresponding to one sampling episode (ESE04) and one self-monitoring episode (ISM60)) to calculate the proposed limitations for lead and zinc. EPA selected this facility using the criteria described in Section 12.1. This facility had separate treatment systems for its basic oxygen furnaces (BOF), continuous casting, and vacuum degassing wastewaters (some underflows were treated together). The effluents from each treatment system were sampled before they were discharged to a common outfall. EPA mathematically composited the data from each sampling point to obtain a single daily concentration value for each pollutant at the outfall (see Section 12.4.3 for the aggregation procedure). (The facility uses a similar mathematical compositing procedure before reporting the monitoring data to its permitting authority.) EPA determined that these data represent the pollutant concentrations for all processes in this subcategory because all processes in the subcategory are represented except for BOFs with wet-suppressed and semi-wet air pollution control systems. However, because the pollutants generated in BOF steelmaking are dependent only upon the materials processed and the chemistry of the steelmaking reaction, EPA has determined that the concentrations achievable by the model treatment technology would also apply to BOFs with wet-suppressed and semi-wet air pollution control systems.

12.2.4 Subpart D: Integrated and Stand-Alone Hot Forming Subcategory

The Integrated and Stand-Alone Hot Forming Subcategory has two segments: Carbon and Alloy Steel Segment and the Stainless Steel Segment. EPA evaluated two options: CARBON_BAT-1 (for the Carbon andAalloy Steel Segment and SPECIALTY_BAT-1 (for the Stainless Steel Segment). The following two subsections describe the data for the two segments.

CARBON_BAT-1

CARBON_BAT-1 is the proposed option for the direct dischargers in the Carbon and Alloy Steel Segment of the Integrated and Stand-Alone Hot Forming Subcategory. EPA selected two facilities corresponding to two sampling episodes (ESE04 and ESE07) and one self-monitoring episode (ISM66) to calculate the proposed limitations for lead, zinc, O&G, and TSS. EPA proposed O&G and TSS standards only for new direct dischargers. EPA selected these episodes using the criteria described in Section 12.1. In addition, both facilities employ high-rate

recycle and process only wastewater from hot strip mill operations. EPA used all of the data from the two sampling episodes in calculating the proposed limitations. EPA excluded the data from ISM66 because the data were collected after wastewater from the Steel Finishing Subcategory were commingled with the effluent from the hot strip mill effluent; the EPA sampling data were collected upstream of where the finishing wastewater was added.

For zinc, the two episodes had substantially different concentration values. Episode ESE04 had all non-detected measurements with sample-specific detection limits ranging from 2.8 to 4 ug/L. In contrast, episode ESE07 had all detected measurements ranging from 140 to 246 ug/L. EPA used the data from both episodes in calculating the proposed limitations. As a result, two of the detected measurements are greater than the proposed daily maximum limitation. For the final rule, EPA will review the data and process information to determine whether both datasets should be used in calculating the limitations.

SPECIALTY_BAT-1

The proposed SPECIALTY_BAT-1 option technology is the basis of the proposed limitations for the direct dischargers in the Stainless Steel Segment of the Integrated and Stand-Alone Hot Forming Subcategory. EPA did not sample any stainless steel integrated or stand-alone hot forming operations and did not obtain any self-monitoring data from this segment. Because water use and wastewater characteristics of stainless steel hot forming operations at non-integrated steel mills are similar to those at integrated and stand-alone hot forming mills, EPA transferred the proposed limitations from the Stainless Steel Segment of the Non-integrated Steelmaking and Hot Forming Subcategory to this segment. (EPA also used the data from that subcategory in selecting the pollutants of concern (POCs) for this segment that are identified in Section 11.) The data for the proposed limitations are discussed further in Section 12.2.5.2.

12.2.5 Subpart E: Non-Integrated Steelmaking and Hot Forming Subcategory

The Non-integrated Steelmaking and Hot Forming Subcategory has two segments: the Carbon and Alloy Steel Segment and the Stainless Steel Segment. EPA evaluated the data for two options: CARBON_BAT-1 (for the Carbon and Alloy Steel Segment) and SPECIALTY_BAT-1 (for the Stainless Steel Segment). The following two subsections describe the data for the two segments.

CARBON_BAT-1

The proposed CARBON_BAT-1 option technology is the basis of the proposed limitations for the direct dischargers in the Carbon and Alloy Steel Segment of the Non-integrated Steelmaking and Hot Forming Subcategory. This segment has three manufacturing processes that discharge wastewater: vacuum degassing, continuous casting, and hot forming. Using the criteria described in Section 12.1, EPA selected data from one facility corresponding to one self-monitoring episode (ISM63) to calculate the proposed limitations for lead and zinc. This facility treats vacuum degassing, continuous casting, and hot forming wastewater in its model technology treatment system. A small amount of noncontact cooling water is also treated in the treatment

system. EPA determined that these data represent the pollutant concentrations for all processes in this segment because all major wastewater-generating processes in the subcategory are represented. EPA used all of the data from this episode in calculating the proposed limitations.

SPECIALTY_BAT-1

The proposed SPECIALTY_BAT-1 option technology is the basis of the proposed limitations and standards for the direct and indirect dischargers in the Stainless Steel Segment of the Non-integrated Steelmaking and Hot Forming Subcategory. Using the criteria described in Section 12.1, EPA selected one facility corresponding to two episodes: one sampling episode (ESE09) and one self-monitoring episode (ISM64). The data from this facility represented wastewaters from continuous casting and hot forming. EPA determined that these data represent the pollutant concentrations for all processes because the continuous casting and hot forming wastestreams comprise the majority of wastestreams covered in this segment and the proposed technology components will treat the metals from all three wastestreams to the same levels regardless of the influent concentration levels. EPA proposed limitations for chromium and nickel. In calculating the proposed limitations, EPA used the chromium data from the sampling episode and the nickel data from both episodes (the self-monitoring episode did not include data for chromium).

In the following discussion, the Integrated and Stand-Alone Hot Forming Subcategory will be identified as the 'Integrated Hot Forming' Subcategory and the Non-integrated Steelmaking and Hot Forming Subcategory as the 'Non-integrated' Subcategory.

EPA transferred the proposed limitations for chromium and nickel to the Integrated Hot Forming Subcategory. EPA also used the data from sampling episode ESE09 to calculate the O&G and TSS standards for the Integrated Hot Forming Subcategory. (As explained in Section 12.1, industry did not supply any O&G data measured as HEM.) For the final rule, EPA will reconsider the exclusion of the TSS data from episode ISM64. Because the data are from the same facility and are similar to the data obtained during the sampling episode, EPA does not expect the limitations would change significantly by adding the additional TSS data (see DCN IS07057 in Section of 8.5 of the proposal record for summary statistics).

While EPA has proposed *no discharge of process wastewater pollutants to waters of the United States* for new sources in the Non-integrated Subcategory, EPA used the O&G and TSS data from this subcategory to develop the proposed standards for the new direct dischargers in the Integrated Hot Forming Subcategory. EPA has determined this is appropriate because the wastewaters are similar in both subcategories. EPA has proposed different types of limitations for the two subcategories based upon observed practices. Some facilities in the Non-integrated Subcategory do not discharge any wastewaters while all facilities in the Integrated Hot Forming Subcategory discharge wastewaters.

12.2.6 Subpart F: Steel Finishing Subcategory

The Steel Finishing Subcategory has two segments: the Carbon and Alloy Steel Segment, and the Stainless Steel Segment. As described in the following subsections, EPA evaluated two options: CARBON_BAT-1 (for the Carbon and Alloy Steel Segment) and SPECIALTY_BAT-1 (for the Stainless Steel Segment). The following two subsections describe the data for each segment.

CARBON_BAT-1

The proposed CARBON_BAT-1 option technology is the basis of the proposed limitations and standards for the direct and new indirect dischargers in the Carbon and Alloy Steel Segment of the Steel Finishing Subcategory. This segment includes manufacturing processes such as acid pickling and cold forming (see Section 6 for the complete list). EPA selected two facilities corresponding to two sampling episodes (ESE04[15] and ESE05) and two self-monitoring episodes (ISM57 and ISM58) to calculate the proposed limitations for chromium, hexavalent chromium, lead, zinc, O&G, and TSS. (EPA proposed O&G and TSS standards only for new direct dischargers.) Both facilities treated a number of finishing operations in their model treatment systems: acid pickling, cold forming, alkaline cleaning, continuous annealing, electroplating, and hot dip coating. EPA determined that these data represent the pollutant concentrations for all processes in this segment because between the two facilities, all manufacturing processes in the subcategory are represented.

For chromium, EPA used the data from both sampling episodes and both self-monitoring episodes in calculating the proposed limitations.

For hexavalent chromium, EPA used the data from both sampling episodes in calculating the proposed limitations.[16] EPA excluded the hexavalent chromium data from self-monitoring episode ISM58 because of concerns about the analytical method (see Section 4.4.7 and DCN IS07058 in Section 8.5 of the proposal record). The other self-monitoring data did not include data for hexavalent chromium.

For lead and zinc, EPA used the data from both sampling episodes and self-monitoring episode ISM57 in calculating the proposed limitations. EPA excluded the data from

[15]EPA collected data for five days for this sampling episode. For four days, EPA obtained samples at a single location. On the fifth day, EPA could not sample at that location and instead obtained samples of the three wastestreams that combined at that location. EPA then field composited the samples to obtain a single composite sample representing that location. In this document, EPA has identified the samples for the five days with the same sample point. Elsewhere in the record, EPA may have used a different sample point number for the fifth day.

[16]EPA excluded a sample-specific detection limit of 100 ug/L that was a duplicate sample from episode ESE05. The corresponding duplicate had a sample-specific detection limit of 10 ug/L which was used in the calculations. EPA excluded the duplicate value of 100 ug/L because it was substantially greater than any detected value (the maximum was 15 ug/L) and because all other sample-specific detection limits were all equal to 10 ug/L.

episode ISM58 because of concerns about the analytical method (see Section 4.4.8 and DCN IS07058 in Section 8.5 of the proposal record).

For O&G, EPA used the O&G data measured as HEM from the two sampling episodes in calculating the proposed standards. (As explained in Section 12.1, industry did not supply any O&G data measured as HEM in its self-monitoring data.)

For TSS, EPA used all of the data from all four episodes in calculating the proposed standards.

SPECIALTY_BAT-1

The proposed SPECIALTY_BAT-1 option technology is the basis for the proposed limitations and standards for the direct and new indirect dischargers in the Stainless Steel Segment of the Steel Finishing Subcategory. EPA selected two facilities corresponding to one sampling episode (ESE06) and one self-monitoring episode (ISM59). EPA proposed limitations for ammonia as nitrogen, chromium, fluoride, hexavalent chromium, nickel, O&G, and TSS. (EPA proposed O&G and TSS limitations only for new sources that are direct dischargers.) In calculating the proposed limitations, EPA used all of the data from the sampling episode. In addition, EPA used the ammonia as nitrogen, chromium, hexavalent chromium, nickel, and TSS data from the self-monitoring episode. The self-monitoring episode did not include data for fluoride or O&G measured as HEM (see Section 12.1).

Episode ESE06 consists of data from electrolytic sodium sulfate descaling, acid pickling, and cold forming. Episode ISM59 consists of data from salt bath descaling, acid pickling, cold forming, continuous annealing, alkaline cleaning, and various other finishing operations (a small amount of stormwater is also processed in the treatment system). EPA determined that these data represent the pollutant concentrations for all processes in this segment because all processes in the subcategory are represented.

In developing the proposed limitations, EPA generally only used data from analytical methods approved for compliance monitoring or those that had been in use by EPA for decades in support of effluent guidelines development. The exceptions included industry supplied data from episode ISM59. The facility did not include any information on the analytical methods corresponding to the reported concentration values. However, because the data were collected at the sampling points specified for compliance monitoring, EPA has assumed that the methods were selected from the methods specified in or approved under 40 CFR Part 136 that facilities are required to use for compliance monitoring. See 40 CFR 122.44(I). For the final rule, EPA intends to contact the facility to confirm its assumption for these data.

For chromium, EPA noted differences between the two episodes for total chromium with episode ESE06 having detected measurements that were generally greater than the detected values from episode ISM59. (The values for episode ESE06 ranged from 69.5 to 298 ug/L and from 34 to 122 ug/L for episode ISM59.) The largest value from episode ESE06 was two times greater than any other value. This concentration value resulted from a batch

discharge from the chromium pretreatment step. EPA has no reason to conclude that this is not part of normal operations and thus has retained this value in calculating the proposed limitations.

For hexavalent chromium, the two episodes had substantially different concentration values. Episode ESE06 had detected measurements ranging from 66 to 215 ug/L. In contrast, episode ISM59 had detected measurements that were all less than the minimum value for episode ESE06. (The values for episode ISM59 ranged from 16 to 44 ug/L.) EPA notes that the data for episode ESE06 were generally high even on the days when the facility did not discharge from the chromium pretreatment step. EPA also notes that some hexavalent chromium values for episode ESE06 are greater than their corresponding chromium values (which theoretically should not occur). EPA used the data from both episodes in calculating the proposed limitations. For the final rule, EPA will review the data and process information to determine whether both datasets should be used in calculating the limitations.

12.2.7 Subpart G: Other Operations

The Other Operations Subcategory has three segments: the Direct Reduced Iron (DRI) Segment, the Forging Segment, and the Briquetting Segment. For the Briquetting Segment, EPA is proposing *no discharge of process wastewater pollutants to waters of the United States* as discussed in Section 8. The next two subsections describe the data used to calculate the proposed limitations for the remaining two segments.

DRI_BPT

The proposed DRI_BPT option technology is the basis for the proposed limitations for the direct dischargers in the DRI Segment of the Other Operations Subcategory. EPA selected data from one facility that had the model technology for TSS (and met the criteria in Section 12.1), which is the only pollutant that EPA is proposing to regulate. This treatment system treats water only from direct reduced ironmaking processes (a small amount of stormwater and equipment cleaning water is also treated in the treatment system). For this facility, EPA had data from one sampling episode (ESE10) and one self-monitoring episode (ISM65) that it used to calculate the proposed limitations for TSS. EPA included all of these data in calculating the proposed TSS limitations.

FORGING

For the Forging Segment, EPA proposed limitations for O&G and TSS for direct dischargers. EPA did not sample forging operations or obtain any forging self-monitoring data from facilities with the model technology. Because EPA has determined that the characteristics of forging operation wastewater are similar to hot forming operation wastewater (see Section 8), EPA transferred the proposed limitations from both segments of the Integrated and Stand-Alone Hot Forming Subcategory. Because, depending on the materials used, the forging operations can create wastestreams similar to either of the Hot Forming Segments, EPA averaged the proposed limitations from the two segments.

12.3 Data Substitutions

EPA used all of the data described in Section 12.2 in calculating the proposed limitations. In general, for these data, EPA used the reported measured value or sample-specific detection limit in its calculations. However, in a few cases, EPA substituted other values for reported values. These substitutions can be divided into three cases.

In the first case, EPA compared each laboratory-reported sample result to a baseline value (defined in Section 4). In some instances, EPA substituted a larger value for the measured value or sample-specific detection limit. This substitution is described in Sections 4.4.1 and 4.5.1.

In the second case, EPA compared the reported results to blank samples. If the process sample resulted in a concentration between the detection limit and ten times the amount detected in the blank sample, EPA considered the result to be non-detected and established a sample-specific detection limit equal to the baseline value (defined in Section 4). EPA made the substitutions because the presence of pollutant could be due to blank contamination. In calculating the proposed limitations, this substitution occurred only for chromium data collected during one sampling episode (ESE09) of the Integrated and Stand-Alone Hot Forming Subcategory.

The third case resulted from slight discrepancies in numerical representation that resulted from converting the database from one software package to another. As a result, values such as 0.01 are represented as 0.00999 in the database that EPA used in calculating the proposed limitations. This discrepancy is often associated with sample-specific detection limits. While any effect on the numerical results should be minimal, for the final rule, EPA will correct the database.

12.4 Data Aggregation

In some cases, EPA determined that two or more samples had to be mathematically aggregated to obtain a single value that could be used in other calculations. In some cases, this meant that field duplicates and grab samples were aggregated for a single sample point. In addition, for one facility, data were aggregated to obtain a single daily value representing the facility's effluent from multiple outfalls. Appendix D lists the data after these aggregations were completed and a single daily value was obtained for each day for each pollutant. (DCN IS07001 in Section 8.1 of the proposal record provides a list of the unaggregated data.)

In all aggregation procedures, EPA considered the censoring type associated with the data. EPA considered measured values to be *detected*. In statistical terms, the censoring type for such data was 'non-censored' (NC). Measurements reported as being less than some sample-specific detection limit (e.g., <10 mg/L) were censored and were considered to be *non-detected*

(ND). In the tables and data listings in this document and the record for the rulemaking, EPA has used the abbreviations NC and ND to indicate the censoring types.[17]

The distinction between the two censoring types is important because the procedure used to determine the variability factors considers censoring type explicitly. This estimation procedure modeled the facility data sets using the modified delta-lognormal distribution. In this distribution, data are modeled as a mixture of two distributions. Thus, EPA concluded that the distinctions between detected and non-detected measurements were important and should be an integral part of any data aggregation procedure. (See Appendix E for a detailed discussion of the modified delta-lognormal distribution.)

Because each aggregated data value entered into the modified delta-lognormal model as a single value, the censoring type associated with that value was also important. In many cases, a single aggregated value was created from unaggregated data that were all either detected or non-detected. In the remaining cases with a mixture of detected and non-detected unaggregated values, EPA determined that the resulting aggregated value should be considered to be detected because the pollutant was measured at detectable levels.

This section describes each of the different aggregation procedures. They are presented in the order that the aggregation was performed. That is, field duplicates were aggregated first, grab samples second, and finally multiple outfalls.

12.4.1 Aggregation of Field Duplicates

During the EPA sampling episodes, EPA collected a small number of field duplicates. Generally, ten percent of the number of samples collected were duplicated. Field duplicates are two samples collected for the same sampling point at approximately the same time, assigned different sample numbers, and flagged as duplicates for a single sample point at a facility.

Because the analytical data from each duplicate pair characterize the same conditions at that time at a single sampling point, EPA aggregated the data to obtain one data value for those conditions. The data value associated with those conditions was the arithmetic average of the duplicate pair.

In most cases, both duplicates in a pair had the same censoring type. In these cases, the censoring type of the aggregate was the same as the duplicates. In the remaining cases, one duplicate was a non-censored value and the other duplicate was a non-detected value. In these cases, EPA determined that the appropriate censoring type of the aggregate was 'non-censored' because the pollutant had been present in one sample. (Even if the other

[17]Laboratories can also report numerical results for specific pollutants detected in the samples as "right-censored." Right-censored measurements are those that are reported as being greater than the highest calibration value of the analysis (e.g., >1000 ug/L). None of the data used in calculating the proposed limitations included any right-censored data.

duplicate had a zero value[18], the pollutant still would have been present if the samples had been physically combined.) Table 12-1 summarizes the procedure for aggregating the analytical results from the field duplicates. This aggregation step for the duplicate pairs was the first step in the aggregation procedures for both influent and effluent measurements.

Table 12-1. Aggregation of Field Duplicates

If the field duplicates are:	Censoring type of average is:	Value of aggregate is:	Formulas for aggregate value of duplicates:
Both non-censored	NC	arithmetic average of measured values	$(NC_1 + NC_2)/2$
Both non-detected	ND	arithmetic average of sample-specific detection limits	$(DL_1 + DL_2)/2$
One non-censored and one non-detected	NC	arithmetic average of measured value and sample-specific detection limit	(NC + DL)/2

NC - non-censored (or detected). ND - non-detected. DL - sample-specific detection limit.

12.4.2 Aggregation of Grab Samples

During the EPA sampling episodes, EPA collected two types of samples: grab and composite. Typically, EPA collected composite samples. Of the pollutants proposed for regulation, O&G was the only one for which the chemical analytical method specifies that grab samples must be used. For O&G, EPA collected multiple (usually four) grab samples during a sampling day at a sample point. To obtain one value characterizing the pollutant levels at the sample point on a single day, EPA mathematically aggregated the measurements from the grab samples.

The procedure arithmetically averaged the measurements to obtain a single value for the day. When one or more measurements were non-censored, EPA determined that the appropriate censoring type of the aggregate was 'non-censored' because the pollutant was present. Table 12-2 summarizes the procedure.

[18]This is presented as a 'worst-case' scenario. In practice, the laboratories cannot measure 'zero' values. Rather they report that the value is less than some level (see Section 4).

Table 12-2. Aggregation of Grab Samples

If the grab or multiple samples are:	Censoring type of Daily Value is:	Daily value is:	Formulas for Calculating Daily Value:
All non-censored	NC	arithmetic average of measured values	$\frac{\sum_{i=1}^{n} NC_i}{n}$
All non-detected	ND	arithmetic average of sample-specific detection limits	$\frac{\sum_{i=1}^{n} DL_i}{n}$
Mixture of non-censored and non-detected values (total number of observations is n=k+m)	NC	arithmetic average of measured values and sample-specific detection limits	$\frac{\sum_{i=1}^{k} NC_i + \sum_{i=1}^{m} DL_i}{n}$

NC - non-censored (or detected). ND - non-detected. DL - sample-specific detection limit.

12.4.3 Aggregation of Data Across Outfalls ("Flow-Weighting")

After field duplicates and grab samples were aggregated, the data were further aggregated across sample points for different outfalls. This step was necessary for one facility (corresponding to two episodes: sampling episode ESE04 with data for three outfalls and self-monitoring episode ISM57 with data for five outfalls) where data from multiple sample points were aggregated to obtain a single daily value representing the episode's effluent from multiple outfalls. In aggregating values across sample points, if one or more of the values were non-censored, then the aggregated result was non-censored (because the pollutant was present in at least one stream). When all of the values were non-detected, then the aggregated result was considered to be non-detected. The procedure for aggregating data across streams is summarized in Table 12-3. The following example demonstrates the procedure for hypothetical pollutant X at an episode with three outfalls all from the model technology on day 1 of the sampling episode.

Example of calculating an aggregated flow-weighted value:

Day	Sample Point	Flow (gal)	Concentration (ug/L)	Censoring
1	SP-A	10,000,000	10	ND
1	SP-B	20,000,000	50	NC
1	SP-C	5,000,000	100	ND

Calculation to obtain aggregated, flow-weighted value:

$$\frac{(10{,}000{,}000\ \text{gal} \times 10\ \text{ug/L}) + (20{,}000{,}000\ \text{gal} \times 50\ \text{ug/L}) + (5{,}000{,}000\ \text{gal} \times 100\ \text{ug/L})}{10{,}000{,}000\ \text{gal} + 20{,}000{,}000\ \text{gal} + 5{,}000{,}000\ \text{gal}} = 45.7\ \text{ug/L} \quad (12\text{-}1)$$

Because one of the three values was non-censored, the aggregated value of 45.7 ug/L is non-censored.

Table 12-3. Aggregation of Data Across Streams

If the n observations are:	Censoring type is:	Formulas for value of aggregate
All non-censored	NC	$\frac{\sum_{i=1}^{n} NC_i \times flow_i}{\sum_{i=1}^{n} flow_i}$
All non-detected	ND	$\frac{\sum_{i=1}^{n} DL_i \times flow_i}{\sum_{i=1}^{n} flow_i}$
Mixture of k non-censored and m non-detected (total number of observations is n=k+m)	NC	$\frac{\sum_{i=1}^{k} NC_i \times flow_i + \sum_{i=1}^{m} DL_i \times flow_i}{\sum_{i=1}^{n} flow_i}$

NC - non-censored (or detected). ND - non-detected. DL - sample-specific detection limit.

12.5 Overview of Limitations

The preceding sections discuss the data selected as the basis for the proposed limitations and the data aggregation procedures EPA used to obtain daily values in its calculations. This section (12.5) provides a general overview of limitations before returning to the development of the proposed limitations for the iron and steel industry in Section 12.6. This section describes EPA's objective for daily maximum and monthly average limitations, the selection of percentiles for those limitations, and compliance with final limitations. EPA has included this discussion in Section 12 because these fundamental concepts are often the subject of comments on EPA's proposed effluent guidelines regulations and in EPA's contacts and correspondence with the iron and steel industry.

12.5.1 Objective

In establishing daily maximum limitations, EPA's objective is to restrict the discharges on a daily basis at a level that is achievable for a facility that targets its treatment at the long-term average. EPA acknowledges that variability around the long-term average results from normal operations. This variability means that occasionally facilities may discharge at a level that is greater than the long-term average. This variability also means that facilities may occasionally

discharge at a level that is considerably lower than the long-term average. To allow for these possibly higher daily discharges, EPA has established the daily maximum limitation. A facility that discharges consistently at a level near the daily maximum limitation would not be operating its treatment to achieve the long-term average, which is part of EPA's objective in establishing the daily maximum limitations. That is, targeting treatment to achieve the limitations may result in frequent values exceeding the limitations due to routine variability in treated effluent.

In establishing monthly average limitations, EPA's objective is to provide an additional restriction to help insure that facilities target their average discharges to achieve the long-term average. The monthly average limitation requires continuous dischargers to provide on-going control, on a monthly basis, that complements controls imposed by the daily maximum limitation. In order to meet the monthly average limitation, a facility must counterbalance a value near the daily maximum limitation with one or more values well below the daily maximum limitation. To achieve compliance, these values must result in a monthly average value at or below the monthly average limitation.

12.5.2 Selection of Percentiles

EPA calculates limitations based upon percentiles chosen with the intention, on one hand, to be high enough to accommodate reasonably anticipated variability within control of the facility and, on the other hand, to be low enough to reflect a level of performance consistent with the Clean Water Act requirement that these effluent limitations be based on the "best" technologies. The daily maximum limitation is an estimate of the 99th percentile of the distribution of the *daily* measurements. The monthly average limitation is an estimate of the 95th percentile of the distribution of the *monthly* averages of the daily measurements.

The 99th and 95th percentiles do not relate to, or specify, the percentage of time a discharger operating the "best available" or "best available demonstrated" level of technology will meet (or not meet) the limitations. Rather, the use of these percentiles relate to the development of limitations. (The percentiles used as a basis for the limitations are calculated using the products of the long-term averages and the variability factors as explained in the next section.) If a facility is designed and operated to achieve the long-term average on a consistent basis and the facility maintains adequate control of its processes and treatment systems, the allowance for variability provided in the limitations is sufficient to meet the requirements of the proposed rule. The use of 99 percent and 95 percent represents a need to draw a line at a definite point in the statistical distributions (100 percent is not feasible because it represents an infinitely large value) and a policy judgment about where to draw the line that would ensure that operators work hard to establish and maintain the appropriate level of control. In essence, in developing the proposed limitations, EPA has taken into account the reasonable anticipated variability in discharges that may occur at a well-operated facility. By targeting its treatment at the long-term average, a well-operated facility should be capable of complying with the limitations at all times because EPA has incorporated an appropriate allowance for variability into the limitations.

In conjunction with the statistical methods, EPA performs an engineering review to verify that the limitations are reasonable based upon the design and expected operation of the

control technologies and the facility process conditions. As part of that review, EPA examines the range of performance by the facility data sets used to calculate the limitations. Some facility data sets demonstrate the best available technology. Other facility data sets may demonstrate the same technology, but not the best demonstrated design and operating conditions for that technology. For these facilities, EPA will evaluate the degree to which the facility can upgrade its design, operating, and maintenance conditions to meet the limitations. If such upgrades are not possible, then the limitations are modified to reflect the lowest levels that the technologies can reasonably be expected to achieve.

12.5.3 Compliance with Limitations

EPA promulgates limitations that facilities are capable of complying with at all times by properly operating and maintaining their processes and treatment technologies. However, the issue of exceedances[19] or excursions is often raised by comments on proposed limitations (as has been EPA's experience with proposals for other industries). For example, comments often suggest that EPA include a provision that a facility is in compliance with permit limitations if its discharge does not exceed the specified limitations, with the exception that the discharge may exceed the monthly average limitations one month out of 20 and the daily average limitations one day out of 100. This issue was, in fact, raised in other rules, most notably in EPA's final Organic Chemicals, Plastics, and Synthetic Fibers (OCPSF) rulemaking. EPA's general approach there for developing limitations based on percentiles is the same in this proposal, and was upheld in Chemical Manufacturers Association v. U.S. Environmental Protection Agency, 870 F.2d 177, 230 (5th Cir. 1989). The Court determined that:

> EPA reasonably concluded that the data points exceeding the 99th and 95th percentiles represent either quality-control problems or upsets because there can be no other explanation for these isolated and extremely high discharges. If these data points result from quality-control problems, the exceedances they represent are within the control of the plant. If, however, the data points represent exceedances beyond the control of the industry, the upset defense is available.
> Id. at 230.

EPA's allowance for reasonable anticipated variability in its effluent limitations, coupled with the availability of the upset defense reasonably accommodates acceptable excursions. Any further excursion allowances would go beyond the reasonable accommodation of variability and would jeopardize the effective control of pollutant discharges on a consistent basis and/or bog down administrative and enforcement proceedings in detailed fact finding exercises, contrary to Congressional intent. See, e.g., Rep. No. 92-414, 92nd Congress, 2nd

[19]Values that exceed the limitations

Sess. 64, reprinted in A Legislative History of the Water Pollution Control Act Amendments of 1972 at 1482; Legislative History of the Clean Water Act of 1977 at 464-65.

EPA recognizes that the preceding discussion is inconsistent with Appendix A in two of the 1982 development documents. (The same appendix is attached to both documents.) This appendix incorrectly implies that EPA condones periodic violations of monthly average limitations in its statement that

> . . . it would be expected that 95 percent of the randomly observed 30-day average values from a treatment system discharging the pollutant at a known mean concentration will fall below this bound. Thus, a well operated plant would be expected, on the average, to incur approximately one violation of the 30-day average limitation during a 20 month period.

This statement does not accurately reflect EPA's interpretation of its 1982 regulations, nor of today's proposed limitations. Rather, EPA expects that facilities will comply with promulgated limitations *at all times*. If the exceedance is caused by an upset condition, the facility would have an affirmative defense to an enforcement action if the requirements of 40 CFR 122.41(n) are met. If the exceedance is caused by a design or operational deficiency, then EPA has determined that the facility's performance does not represent the appropriate level of control (best available technology for existing sources; best available demonstrated technology for new sources). For promulgated limitations and standards, EPA has determined that such exceedances can be controlled by diligent process and wastewater treatment system operational practices such as frequent inspection and repair of equipment, use of back-up systems, and operator training and performance evaluations.

12.6 Summary of Proposed Limitations

The proposed limitations for pollutants for each option are provided as 'daily maximums' and 'maximums for monthly averages' (except for pH as described below). Definitions provided in 40 CFR 122.2 state that the daily maximum limitation is the "highest allowable 'daily discharge'" and the maximum for monthly average limitation (also referred to as the "monthly average limitation") is the "highest allowable average of 'daily discharges' over a calendar month, calculated as the sum of all 'daily discharges' measured during a calendar month divided by the number of 'daily discharges' measured during that month." Daily discharges are defined to be the "'discharge of a pollutant' measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of samplings."

EPA has proposed five types of limitations for the iron and steel industry as follows:

Type 1: Proposed daily maximum and monthly average limitations expressed in terms of allowable pollutant discharge (pounds) per

unit of production (short tons). Most of the proposed limitations are of this type.

Type 2: Proposed daily maximum and monthly average limitations are expressed in terms of allowable pollutant discharge (pounds) per day. This second type is used for fume scrubber operations (both wet pollution and acid regeneration) in the Steel Finishing Subcategory.

Type 3: Proposed daily maximum limitations for 2,3,7,8-tetrachlorodibenzo-furan (TCDF) are expressed as less than the minimum level ("<ML") or ten parts per quadrillion using the analytical method for TCDF specified in 40 CFR Part 136. These proposed limitations are specified as daily maximums for the Sintering Segment of the Ironmaking Subcategory (and the Blast Segment when wastewaters are combined with sintering wastewater). EPA has not proposed monthly average limitations for this pollutant because EPA assumed that facilities will monitor for this pollutant only once a month.

Type 4: Proposed limitations for pH which are specified as a range of values between 6 and 9. These proposed limitations are discussed in Section IX.A in the preamble to the proposed rulemaking.

Type 5: For certain processes and discharge types (that is, some new sources and indirect dischargers), EPA has determined that there shall be *no discharge of process wastewater pollutants to waters of the United States.* This requirement is discussed in Section 7.

The remainder of Section 12 mainly describes the development of the limitations corresponding to Types 1 and 2. In this document and elsewhere, EPA refers to such limitations as 'production-normalized.' EPA has proposed production-normalized limitations in terms of daily maximums and maximum for monthly averages for all pollutants except total residual chlorine (TRC). For TRC, EPA has proposed only daily maximum limitations as explained in Section 12.9.

To derive the proposed production-normalization limitations, EPA used the modified delta-lognormal distribution to develop limitations based upon the concentration data ("concentration-based limitations"). Section 12.7 describes the calculations for the concentration-based limitations. Section 12.8 describes the conversion of these limitations to "production-normalized limitations" using the model flow rates described in Section 7.

12.7 Estimation of Concentration-Based Limitations

In estimating the concentration-based limitations (except TCDF which is described in the previous section), EPA determines an average performance level (the "option long-term average" discussed in the next section) that a facility with well-designed and operated model technologies (which reflect the appropriate level of control) is capable of achieving. This long-term average is calculated from the data from the facilities using the model technologies for the option (these data are described in Section 12.2). EPA expects that all facilities subject to the limitations will design and operate their treatment systems to achieve the long-term average performance level on a consistent basis because facilities with well-designed and operated model technologies have demonstrated that this can be done.

In the second step of developing a limitation, EPA determines an allowance for the variation in pollutant concentrations when processed through extensive and well designed treatment systems. This allowance for variance incorporates all components of variability including shipping, sampling, storage, and analytical variability. This allowance is incorporated into the limitations through the use of the variability factors (the "option variability factor" discussed in Section 12.7.4) which are calculated from the data from the facilities using the model technologies. If a facility operates its treatment system to meet the relevant long-term average, EPA expects the facility will be able to meet the limitations. Variability factors assure that normal fluctuations in a facility's treatment are accounted for in the limitations. By accounting for these reasonable excursions above the long-term average, EPA's use of variability factors results in limitations that are generally well above the actual long-term averages.

Facilities that are designed and operated to achieve long-term average effluent levels used in developing the limitation should be capable of compliance with the proposed limitations, which incorporate variability, at all times.

The following sections describe the calculation of the option long-term averages and option variability factors.

12.7.1 Calculation of Option Long-Term Averages

This section discusses the calculation of long-term averages by episode ("episode-specific long-term average") and by option ("option long-term average") for each pollutant. These long-term averages discussed in this section were used to calculate the proposed limitations.[20]

First, EPA calculated the episode-specific long-term average by using either the modified delta-lognormal distribution or the arithmetic average (see Appendix E). In Attachment

[20]For costing purposes, EPA used the arithmetic averages of the data. Because the costing analyses were performed earlier than the calculation of the proposed limitations, most of the data exclusions were not incorporated in the costing analyses. However, before incorporating the data exclusions into the proposed limitations, EPA concluded that the impact of the data exclusions on the costing analyses would not be sufficient to result in selection of a different option.

12-1 in Appendix F, EPA has listed the arithmetic average (column labeled 'Obs Mean') and the estimated episode-specific long-term average (column labeled 'Est LTA'). If EPA used the arithmetic average as the episode long-term average, then the two columns have the same value.

Second, EPA calculated the option long-term average for a pollutant as the *median* of the episode-specific long-term averages for that pollutant from selected episodes with the technology basis for the option (see Sections 12.1 and 12.2). The median is the midpoint of the values ordered (i.e., ranked) from smallest to largest. If there is an odd number of values (with n=number of values), then the value of the (n+1)/2 ordered observation is the median. If there are an even number of values, then the two values of the n/2 and [(n/2)+1] ordered observations are arithmetically averaged to obtain the median value.

For example, for subcategory Y option Z, if the four (i.e., n=4) episode-specific long-term averages for pollutant X are:

Facility	Episode-Specific Long-Term Average
A	20 mg/l
B	9 mg/l
C	16 mg/l
D	10 mg/l

then the ordered values are:

Order	Facility	Episode-Specific Long-Term Average
1	A	9 mg/l
2	B	10 mg/l
3	C	16 mg/l
4	D	20 mg/l

And the pollutant-specific long-term average for option Z is the median of the ordered values (i.e., the average of the 2nd and 3rd ordered values): (10+16)/2 mg/l = 13 mg/l.

The option long-term averages were used in developing the proposed limitations for each pollutant within each regulatory option.

12.7.2 Comparison of Option Long-Term Averages to Baseline Values

After calculating the option long-term averages for each pollutant, EPA compared these values to the baseline values provided in Section 4. If the option long-term average was less than the baseline value, EPA substituted the baseline value for the option long-term average.

(This comparison is described in more detail in Section 4.4.) Table 12-4 identifies the cases for which the baseline value was substituted for the calculated long-term average.[21]

Table 12-4. Option Long-Term Averages Replaced by the Baseline Values

Pollutant	Baseline Value (ug/L)	Subcategory	Option	Calculated Option Long-Term Average (ug/L)
Lead	50	Finishing	CARBON_BAT-1	2.0
		Integrated and Stand-Alone Hot Forming	CARBON_BAT-1	12.3
		Integrated Steelmaking	BAT-1	12.9
		Ironmaking	BAT-1	3.5
			PSES-1	33.0
		Non-Integrated Steelmaking and Hot Forming	CARBON_BAT-1	1.0
TSS	4,000	Finishing	SPECIALTY_BAT-1	3,454

12.7.3 Transfer of Option Long-Term Average

For the BAT-1 option in the Ironmaking Subcategory, EPA did not receive any data for phenol from the model technology. (See Section 12.2.2.1.) For this single case, EPA transferred the option long-term average from an option in the 1982 rulemaking. This long-term average (0.01 mg/L) was the same for both the sintering and ironmaking subcategories for the 1982 rule.

12.7.4 Calculation of Option Variability Factors

In developing the option variability factors used in calculating the proposed limitations, EPA first developed daily and monthly episode-specific variability factors using the modified delta-lognormal distribution. This estimation procedure is described in Appendix E. Attachment 12-2 in Appendix F lists the episode-specific variability factors.

After calculating the episode-specific variability factors, EPA calculated the option daily variability factor as the *mean* of the episode-specific daily variability factors for that pollutant in the subcategory and option. Likewise, the option monthly variability factor was the mean of the episode-specific monthly variability factors for that pollutant in the subcategory and option. Attachment 12-3 in Appendix F lists the option variability factors.

[21]EPA made this substitution only for the purposes of calculating the proposed limitations. Elsewhere in its evaluation of the industry (such as costing and benefits estimation), EPA used the values as calculated.

12.7.5 Transfers of Option Variability Factors

After estimating the option variability factors, EPA identified several pollutants for which variability factors could not be calculated in some options. This resulted when all episode datasets for the pollutant in the option had too few detected measurements to calculate episode-specific variability factors (see data requirements in Appendix E). For example, if a pollutant had all non-detected values for all of the episodes in an option, then it was not possible to calculate option variability factors. When EPA could not calculate the option variability factors or determined that the calculated option variability factors should be replaced, EPA selected variability factors from other sources to provide an adequate allowance for variability in the proposed limitations. This section describes these cases.

Table 12-5 lists the pollutants for which EPA was unable to calculate option variability factors. The following paragraphs describe EPA's determination for each case.

Table 12-5. Cases where Option Variability Factors Could Not be Calculated

Subcategory	Option	Pollutant	Source of Variability Factors
Cokemaking	BAT-1	Benzo(a)pyrene	naphthalene, same option
		Phenol	OCPSF phenol values from biological treatment (2.49705, 1.40602)
Steel Finishing	SPECIALTY_BAT-1	Oil & Grease	median of Oil & Grease variability factors from all non-cokemaking subcategories (see Table 12-6)
Ironmaking	PSES-1	Oil & Grease	
Other Operations	DRI_BPT	Oil & Grease	
Non-Integrated Steelmaking and Hot Forming	CARBON_BAT-1	Lead	median of lead VFs across subcategories and options where lead has proposed limitations

For benzo(a)pyrene in the BAT-1 option of the Cokemaking Subcategory, EPA transferred the option variability factors for naphthalene from the same option. EPA expects that these two pollutants would have similar variability in the effluent concentrations because they are chemically similar.

Likewise for phenol in the BAT-1 option of the Cokemaking Subcategory, EPA transferred the variability factors that were used to develop the promulgated limitations for the Organic Chemicals, Plastics, and Synthetic Fibers (OCPSF) industry. These variability factors for phenol are listed in Table VII-66 'Individual Toxic Pollutant Variability Factors for BAT Subcategory One' on page VII-222 of the OCPSF Development Document.[22] EPA has determined that it is reasonable to transfer the variability factors from that industry to the

[22]U.S. Environmental Protection Agency. Development Document for Effluent Limitations Guidelines and Standards for the Organic Chemicals, Plastics, and Synthetic Fibers Point Source Category. Volume I, Volume II. EPA 440/1-87/009, 1987.

Cokemaking Subcategory because of similarities in the model technologies. (Both OCPSF and iron and steel assume weekly monitoring in calculating the monthly variability factors.)

For O&G, because there were too few detected measurements, option variability factors could not be calculated for two options: SPECIALTY_BAT-1 in the Steel Finishing Subcategory and PSES-1 in the Ironmaking Subcategory. For these options, EPA used the median of the option variability factors from all subcategories where EPA proposes to regulate O&G, except the Cokemaking Subcategory. (These option variability factors are listed in Table 12-6.) EPA excluded the Cokemaking Subcategory from the median calculations because the BAT-1 option in cokemaking includes biological treatment, which is not a component of the other model technologies.

Table 12-6. O&G Long-Term Averages and Variability Factors

Subcategory	Option	Long-Term Average (mg/L)	Variability Factors	
			Daily	Monthly
Cokemaking	BAT-1	7.24	2.57	1.39
Steel Finishing	CARBON_BAT-1	6.28	1.19	1.07
	SPECIALTY_BAT-1	6.20	N/A	N/A
Integrated and Stand-Alone Hot Forming	CARBON_BAT-1	6.58	1.44	1.14
Non-Integrated Steelmaking and Hot Forming	SPECIALTY_BAT-1	9.20	3.07	1.56
Ironmaking	PSES-1	5.88	N/A	N/A
Median Variability Factors (excluding Cokemaking)			1.44	1.14

N/A - Variability Factors could not be calculated for this option.

For lead, EPA determined that the median of the lead variability factors should be used for the PSES-1 option of the Non-integrated Steelmaking and Hot Forming Subcategory. (See Table 12-7.) Further, EPA determined that these median variability factors should be applied to all subcategories where lead has proposed limitations. EPA made this determination because the variability factors vary widely (from 1.65 to 8.57 for the daily variability factors) from option to option, but the long-term averages are all equal to the same value of 50 ug/L. (This is because all of the calculated long-term averages were below the baseline value of 50 ug/L as explained in Section 12.7.2.) Before making this determination, EPA compared the largest detected value for each option to the proposed daily maximum limitation of 146 ug/L derived from the baseline value and the median variability factor. All of the detected concentrations were substantially below the proposed daily maximum limitation.

Table 12-7. Lead Long-Term Averages and Variability Factors

Subcategory	Option	Baseline Value (new LTA) ug/L	Maximum Detected Value (ug/L)	Calculated Long-Term Average (ug/L)	Variability Factors	
					Daily	Monthly
Steel Finishing	CARBON_BAT-1	50	12	2.00	1.65	1.11
Integrated and Stand-Alone Hot Forming	CARBON_BAT-1	50	12	12.85	6.80	2.35
Integrated Steel	BAT-1	50	33	26.78	1.75	1.22
Ironmaking	BAT-1	50	23	3.47	8.57	2.70
	PSES-1	50	68	33.05	2.92	1.52
Non-Integrated Steelmaking and Hot Forming	CARBON_BAT-1	50	all non-detected	1.0	n/a	n/a
				Median Variability Factors:	2.92	1.52

12.7.6 Summary of Steps Used to Derive Concentration-Based Limitations

This section summarizes the steps used to derive the proposed concentration-based limitations. For each pollutant in an option for a subcategory, EPA performed the following steps in calculating the proposed concentration-based limitations:

Step 1 EPA calculated the *episode-specific long-term averages and daily and monthly variability factors* for all selected episodes with the model technology for the option in the subcategory. (See Section 12.2 for selection of episodes and Attachment 12-2 in Appendix F for episode-specific long-term averages and variability factors.)

Step 2 EPA calculated the *option long-term average* as the median of the episode-specific long-term averages. (See Attachment 12-3 in Appendix F.)

Step 3 EPA calculated the *option variability factors* for each pollutants as the mean of the episode-specific variability factors from the episodes with the model technology. (See Attachment 12-3 in Appendix F.) The option daily variability factor is the mean of the episode-specific daily variability factors. Similarly, the option monthly variability factor is the mean of the episode-specific monthly variability factors.

Step 4 For the pollutants for which Steps 1 and 3 failed to provide option variability factors, EPA determined variability factors on a case-by-case basis. (See Table 12-5.)

Step 5 EPA calculated each proposed concentration-based *daily maximum limitation* for a pollutant using the product of the option long-term average and the option daily variability factor. (See Attachment 12-3 in Appendix F.)

Step 6 EPA calculated each proposed concentration-based *monthly average limitation* for a pollutant using the product of the option long-term average and the option monthly variability factor. (See Attachment 12-3 in Appendix F.)

Step 7 EPA *compared* the proposed daily maximum limitations to the data used to develop the limitations. EPA performed this comparison to determine if EPA used appropriate distributional assumptions for the data used to develop the limitations, in other words, whether the curves EPA used provide a reasonable "fit" to the actual effluent data.[23] (See DCN IS07030 in Section 8.3 of the proposal record.)

The next section describes the conversion of the concentration-based limitations to the production-normalized limitations that are provided in the proposed regulation.

12.8 Conversion to Production-Normalized Limitations

The previous discussions about the limitations were based upon concentration data. However, except for 2,3,7,8-TCDF and pH (see Section 12.6), EPA proposed limitations expressed as pounds per short ton (lbs/ton) and pounds per day (lbs/day). The current Part 420 regulation and other previous mass-based regulations have presented pollutant limitations in terms of kilograms of allowable pollutant discharge per thousand kilograms of production (kg/kkg), also expressed as pounds of allowable pollutant discharge per thousand pounds of production (lbs/1,000 lbs). Today's proposed regulation presents pollutant limitations in terms of pounds of allowable pollutant discharge per ton of production (lbs/ton). The Agency made this change to express the limitations in terms of the production value that is a standard throughout the industry. In section XIII.B of the preamble to the proposed rule, the Agency has requested comments on this format.

This section describes the conversion from concentration-based limitations to the production-normalized limitations in the proposed regulation. This section also provides EPA's methodology for determining the number of significant digits to use for the proposed production-normalized limitations.

12.8.1 Conversion from Concentration-Based Limitations

In calculating the proposed production-normalized limitations, EPA used the concentration-based limitations, the production flow rates, and one of two conversions factors.

[23]EPA believes that the fact that EPA performs such an analysis before proposing limitations may give the impression that EPA expects occasional exceedances of the limitations. This conclusion is incorrect. EPA promulgates limitations that facilities are capable of complying with at all times by properly operating and maintaining their treatment technologies. This concept is explained in greater detail in DCN IS07030 in Section 8.3 of the proposal record.

The concentration-based limitations are calculated as described in the previous section and are listed in Attachment 12-3 in Appendix F. The following paragraphs briefly describe the production flow rates and the conversion factors used to calculate the production-normalized limitations.

The production flow rates used in the calculation are expressed as production-normalized flow rates (PNFs) in terms of gallons of water discharged per ton of production (gpt) for all operations except certain fume scrubbers (wet air pollution control devices and acid regeneration for steel finishing operations) where the flow rates are expressed in gallons per minute (gpm). The production-normalized flow rates are provided in Attachment 12-4 in Appendix F (the derivation of these flow rates is explained in Section 7).

EPA used two different conversion factors depending on whether the production-normalized flow rates were expressed as gallons per ton (gpt or gal/ton) or gallons per minute (gpm or gal/min). Both conversion factors assume that the concentration-based limitations are expressed as micrograms per liter (ug/L).[24] These two conversion factors are listed below:

Conversion factor 1: used to obtain proposed limitations expressed as pounds per ton (lb/ton) for all processes except fume scrubbers and acid regeneration:

$$\text{ConversionFactor 1} = \frac{3.7854\text{L}}{\text{gal}} \times \frac{\text{lb}}{453.593\times10^{6}\text{mg}} = 8.3454\times10^{-9}\ \frac{\text{L/gal}}{\text{mg/lb}} \qquad (12\text{-}2)$$

Conversion Factor 2: used to obtain proposed limitations expressed as pounds per day (lb/day) for fume scrubbers and acid regeneration processes:

$$\text{Conversion Factor 2} = \text{Conversion Factor 1}\times\frac{60\ \text{min}}{\text{hr}}\times\frac{24\ \text{hr}}{\text{day}} = 1.2017\times10^{-5}\ \frac{\text{L/gal}}{\text{mg/lb}}\frac{\text{min}}{\text{day}} \qquad (12\text{-}3)$$

The following is an example of applying the first conversion factor:

> For the Ironmaking Subcategory option BAT-1, suppose the concentration based daily maximum limitation is 100 ug/L. Using the production value of 75 gpt for the Ironmaking Subcategory, the production-normalized daily maximum limitation ($limit1_{pn}$) is:

$$Limit1_{pn} = 100\frac{mg}{L}\times 75\frac{gal}{short\ ton}\times 8.3454\times10^{-9}\ \frac{L/gal}{mg/lb} = 0.0000626\frac{lb}{ton} \qquad (12\text{-}4)$$

[24]To convert concentration-based limitations expressed as milligrams per liter (mg/L) rather than ug/L, both conversion factors were multiplied by 1000.

EPA used the production flows and conversion factors to calculate each production-normalized limitation using the following basic equation:

Production-normalized limitation =
Concentration-based limitation × Production-normalized flow rate × conversion factor

12.8.2 Significant Digits for Production-Normalized Limitations

After completing the conversions described in the previous section, EPA rounded the proposed production-normalized limitations to three significant digits. EPA used a rounding procedure where values of five and above are rounded up and values of four and below are rounded down. For example, a value of 0.003455 would be rounded to 0.00346, while a value of 0.003454 would be rounded to 0.00345. The production-normalized limitations listed in Attachment 12-5 in Appendix F have three significant digits.

12.9 Transfers of Limitations

In some cases, EPA was either unable to calculate a limitation using the available data for an option or determined that the treatment provided by facilities employing the option did not represent the appropriate level of treatment for the model technologies. In these cases, EPA based the proposed limitations for one option upon data from another option or from the 1982 regulation. In effect, EPA has transferred the limitations from one option to another. Table 12-8 identifies each case and the section that provides EPA's rationale for the transfer.

Table 12-8. Transfers of Proposed Limitations

Target Subcategory/Option	Transfers discussed in Section:	Source of Limit Transfer	Pollutant
Cokemaking By-Product/BAT-3	12.2.1.1	BAT-1 (same subcategory)	Benzo(a)pyrene Oil & Grease Mercury Naphthalene Phenol Selenium Thiocyanate TSS
Cokemaking By-Product/BAT-3 (cont.)	12.2.1.1	1982 Regulation (ironmaking/sinter subcategories)	TRC[1]
Ironmaking/ BAT-1	12.2.2.1	PSES-1 (same subcategory)	2378-TCDF (Sintering Subcategory only) Oil & Grease
		1982 Regulation (ironmaking/sinter subcategories)	TRC[1] TSS
Integrated and Stand-Alone Hot Forming / SPECIALTY_BAT-1 (Stainless Steel Segment)	12.2.4.2	Non-Integrated Steelmaking and Hot Forming / SPECIALTY_BAT-1	Chromium Oil & Grease Nickel TSS
Other Operations/Forging	12.2.7.2	Average of the proposed BAT-1 limitations for the two options (CARBON_BAT-1 and SPECIALTY_BAT-1) in the Integrated and Stand-Alone Hot Forming Subcategory	Oil & Grease TSS

[1]EPA proposed only daily maximum limitations for TRC because the 1982 regulations do not include monthly average limitations.

For the proposed limitations transferred from other options (rather than the 1982 regulation), EPA transferred the concentration-based limitations (listed in Attachment 12-3 in Appendix F) and converted them to production-normalized limitations using the appropriate production values identified in Attachment 12-4 in Appendix F. (The proposed limitations for 2,3,7,8-TCDF were not converted to production-normalized limitations because the limitations are expressed as less than the minimum level ("<ML") or ten parts per quadrillion using the analytical method for TCDF specified in 40 CFR Part 136.)

For the proposed limitations transferred from the 1982 regulation, EPA adjusted the production-normalized limitations for the proposed production-normalized flow (listed in Section 12-4) and the change in units from the pounds per 1000 pounds in the 1982 regulation to the proposed pounds per ton. For example, in converting the total residual chlorine (TRC) daily maximum limitation ('limit1') of 0.000146 lb/1000 lb from the Ironmaking Subcategory to the Cokemaking Subcategory, EPA adjusted for the production-normalized flows by using the ratio of the proposed production-normalized flow of 158 gal/ton for the Cokemaking Subcategory to the production-normalized flow of 70 gal/ton used in 1982 to develop the ironmaking limitation. EPA then multiplied by 2 to convert from lb/1000 lb to lb/ton. After these conversion, EPA obtained the proposed value of 0.000165 lb/ton:

TRC proposed daily maximum limitation for cokemaking

$$= 0.000146 \ \frac{\text{lb}}{1000 \text{ lb}} \times \frac{158 \ \frac{\text{gal}}{\text{ton}}}{70 \ \frac{\text{gal}}{\text{ton}}} \times \left(2 \times \frac{1000 \text{ lb}}{\text{ton}} \right) = 0.000165 \ \frac{\text{lb}}{\text{ton}} \qquad (12\text{-}5)$$

As explained in Section 12.2, EPA has concluded that the transfers of these proposed limitations are appropriate after considering the technology bases. As such, EPA has every reason to conclude that facilities employing the option technology could achieve the proposed limitations.

In the proposed regulation, EPA modified the expression of some limitations (such as BPT limitations for most subcategories) from those in the 1982 regulation. EPA has done this so that the limitations correspond to the proposed subcategorization described in Section 6. In this modification, EPA has expressed the limitations in terms of lb/ton rather than lb/1000 lb (or kg/1000 kg) used in the 1982 regulation. The corresponding numerical values are now twice as large as those in the 1982 regulation. However, while the numerical values in the proposed regulation are greater than those in the 1982 regulation, they are mathematically equivalent because of the change in the units from lb/1000 lb to lb/ton. For example, a limitation of 0.0300 lb/1000 lb in the 1982 regulation is the same as 0.0600 lb/ton in the proposed regulation. The Agency made this change to express the limitations in terms of the production value that is a standard throughout the industry. In section XIII.B of the preamble to the proposed rule, the Agency has requested comments on this format.

SECTION 13

NON-WATER QUALITY ENVIRONMENTAL IMPACTS

Sections 304(b) and 306 of the Clean Water Act require EPA to consider non-water quality environmental impacts, including energy requirements, associated with effluent limitations guidelines and standards. In accordance with these requirements, EPA has considered the potential impacts of the proposed regulation on energy consumption, air emissions, and solid waste generation. Agency estimates of these impacts for each subcategory are presented in Table 13-1 and summarized in Sections 13.1, 13.2, and 13.3.

13.1 Energy Requirement Impacts

Table 13-1 summarizes energy requirements, as reported in the industry surveys, by subcategory. Table 13-2 presents the incremental energy requirements for each option within each subcategory. EPA determined the incremental energy requirements only for those new treatment units that would be necessary to upgrade to the model treatment systems. The energy requirements for each option are discussed in the subsections below. In general, additional energy requirements are a result of the electric motors in new or upgraded cooling water recycle and treatment systems to drive water pumps, chemical mixers, aeration equipment such as blowers and compressors, and cooling tower fans. Energy requirements are calculated by summing the total horsepower (HP) needed for each recycling or treatment step, converting horsepower to kilowatts (kW), and multiplying by the operational time (hours). The equation below shows the conversion from total system horsepower to annual electrical usage (Reference 13-1) in kilowatt-hours per year (kWh/yr).

$$\text{Energy Required} = 0.7456 \frac{\text{kW}}{\text{HP}} \times \text{HP} \times \text{HPY} \qquad (13\text{-}1)$$

where:

HP = Total horsepower required by additional equipment
HPY = Hours per year of equipment operation.

13.1.1 Cokemaking Subcategory

This subcategory contains 14 direct dischargers and eight indirect dischargers. Additional energy requirements are shown in Table 13-2 for BAT-1 (tar removal, ammonia distillation, and biological treatment) and BAT-2 (tar removal, ammonia distillation, cyanide precipitation, and biological treatment) can be attributed to two direct dischargers installing aerobic biological nitrification basins and seven installing cyanide precipitation. The significant increase in energy requirements between BAT-2 and BAT-3 is a result of alkaline chlorination being added to all 14 direct dischargers. Added energy requirements for BAT-4 are for pumping effluent from the alkaline chlorination system through 12 new multimedia filtration and carbon adsorption systems.

None of the eight indirect dischargers are expected to install additional equipment to comply with PSES-1 (tar removal, flow equalization and ammonia distillation) and, therefore, there will be no additional energy requirements. Additional energy requirements for PSES-2, 0.3 million kWh/yr, are based on four facilities adding cyanide precipitation and multimedia filtration. For PSES-3, EPA estimated additional energy requirements totaling 12 million kWh/yr based on five facilities installing indirect cooling, flow equalization, and biological treatment. EPA estimated additional energy requirements for PSES-4, 17 million kWh/yr for five facilities installing indirect cooling, flow equalization, biological treatment, and alkaline chlorination, plus three facilities installing alkaline chlorination only.

Neither of the two non-recovery cokemaking facilities generate wastewater and, therefore, EPA estimates there will be no additional energy requirements for that segment.

13.1.2 Ironmaking Subcategory

There are 13 direct dischargers in this subcategory. EPA estimates that the additional energy requirements shown in Table 13-2 for BAT-1 (high-rate recycle and blowdown treatment) are the result of two new high-rate recycle systems. The treatment and recycle systems include solids removal using scale pits, roughing clarifiers or multimedia filters, induced draft cooling towers to lower the water temperature, and pump stations to return the treated and cooled water to the ironmaking process. EPA estimates that the indirect discharging ironmaking facilities will not need to add treatment units to upgrade to the model PSES-1 treatment system.

13.1.3 Integrated Steelmaking Subcategory

This category includes 20 direct dischargers. The Agency estimates that the additional energy requirements shown in Table 13-2 are a result of one new high-rate continuous caster recycle system and nine chemical precipitation systems for treatment of blowdown water. The treatment and recycle systems include solids removal using a classifier and clarifier, induced draft cooling towers for vacuum degassing and continuous casting wastewater, and pump stations to return the treated and cooled water to the steelmaking process. Chemical precipitation systems remove metals from the recycle system blowdown water and include reaction tanks with mixers, clarifiers, thickeners, and filter presses. EPA estimates that direct dischargers in this subcategory will use approximately 8 million kWh/yr of additional energy requirements to upgrade to the BAT model system. EPA estimates that indirect discharging integrated steelmaking facilities will not need additional treatment units to upgrade to the model PSES-1 treatment system and, therefore, no additional energy requirements are expected.

13.1.4 Integrated and Stand-Alone Hot Forming Subcategory

This subcategory includes 44 direct dischargers and 10 indirect dischargers. BAT-1 for the integrated and stand-alone hot forming mills requires the greatest amount of additional electrical energy of the proposed subcategories (see Table 13-2). EPA estimates that 169 million kWh/yr of additional electricity will be required to comply with the BAT-1 model system, an increase of 29 percent. The Agency estimates that 12 sites would install high-rate recycle systems

to replace existing partial or once-through treatment systems and two of these mills will install new recycle systems consisting of roughing clarifiers with oil removal, multimedia filtration, induced draft cooling towers, and pump stations to recycle the treated and cooled water to the steelmaking process. EPA estimates that an additional seven mills will install new multimedia filters for removal of suspended solids from recycle system blowdown water. A number of mills will recycle in excess of a total of 20,000 gallons per minute (gpm) of wastewater, in the Agency's estimate.

For PSES-1, EPA expects two carbon manufacturing facilities to install a multimedia filter and another stainless steel manufacturing facility to install a cooling water recycle system consisting of a roughing clarifier, multimedia filter, cooling tower, and pump station. As shown in Table 13-2, EPA estimated that indirect dischargers will require an additional 1 million kWh/yr of additional electricity to comply with this model option.

13.1.5 Non-Integrated Steelmaking and Hot Forming Subcategory

This subcategory has 43 direct dischargers, 19 indirect dischargers, and 34 zero dischargers. The additional 8 million kilowatt-hours of energy that EPA estimates is required for BAT-1 (see Table 13-2) for the non-integrated steelmaking and hot forming operations are primarily due to the addition of multimedia filters to remove suspended solids from cooling water recycle system blowdown. EPA estimates that 13 carbon and stainless steel sites will install multimedia filtration systems as a result of the regulation. The Agency also estimates that two sites manufacturing carbon steel products will install new high-rate recycle systems as well as multimedia filters for blowdown treatment to meet BAT-1 requirements.

EPA estimated no additional energy requirements for sites to comply with pretreatment standards for the two indirect discharging non-integrated steelmaking and hot forming sites manufacturing stainless steel.

13.1.6 Steel Finishing Subcategory

This subcategory has 69 direct dischargers, 45 indirect dischargers, and 27 zero dischargers. EPA estimates that one carbon finishing facility will consume approximately 2 million kWh/yr of additional energy (see Table 13-2) to reduce its recycle system blowdown to meet the proposed production-normalized flow rates (PNF). EPA expects the proposed pretreatment standards (PSES-1) for the steel finishing subcategory to increase energy requirements by approximately 0.1 million kilowatt-hours per year.

13.1.7 Other Operations Subcategory

The Other Operations Subcategory includes two direct reduced ironmaking (DRI) facilities, 14 forging facilities, and 4 briquetting facilities. EPA estimates that additional power would be required for one DRI facility under BPT. All forging operations currently have the BPT in place and, therefore, no additional energy is required. The briquetting facilities do not

discharge process wastewater, and EPA does not expect facilities in this segment to install additional treatment equipment.

13.1.8 Energy Requirements Summary

Based on information provided in the industry surveys, the iron and steel industry currently consumes approximately 3.2 billion kWh/yr of electricity for wastewater treatment. EPA estimates that compliance with the proposed Iron and Steel regulation will result in a net increase in energy consumption of 231 million kWh/yr of electricity for the entire industry, or approximately 7 percent. As described previously, the projected increase in energy consumption is primarily due to the incorporation of components such as pumps, mixers, blowers, and fans.

In 1997, the United States consumed approximately 3,122 billion kilowatt hours of electricity (Reference 13-2). The 231-million-kWh/yr increase in electricity as a result of the proposed regulation corresponds to approximately 0.007 percent of the national requirements. The increase in energy requirements due to the implementation of the proposed rule will in turn increase air emissions from the electric power generation facilities. The increase in air emissions is expected to be proportional to the increase in energy requirements, or approximately 0.007 percent.

13.2 Air Emission Impacts

Various subcategories within the iron and steel industry generate process waters that contain significant concentrations of organic and inorganic compounds, some of which are listed as Hazardous Air Pollutants (HAPs) in Title III of the Clean Air Act Amendments of 1990. The Agency developed National Emission Standards for Hazardous Air Pollutants (NESHAPs) under Section 112 of the Clean Air Act, which addresses air emissions of HAPs for certain manufacturing operations. Subcategories within the iron and steel industry where NESHAPs are applicable include cokemaking (58 FR 57898, October 1993) and steel finishing with chromium electroplating (60 FR 4948, January 1995).

For the Cokemaking Subcategory, EPA is currently developing maximum achievable control technology (MACT) standards for pushing, quenching, and battery stacks operations. Like effluent limitations guidelines and standards, MACT standards are technology-based. The Clean Air Act sets maximum control requirements on which MACT standards can be based for new and existing sources. By-products recovery operations in the Cokemaking Subcategory remove the majority of HAPs through processes that collect or produce tar, heavy and light oils, ammonium sulfate, anhydrous ammonia, and elemental sulfur. Ammonia, hydrogen sulfide, and hydrogen cyanide removal by steam stripping could generate a potential air quality issue if uncontrolled; however, these stripping operations at cokemaking facilities capture vapors and return them to the coke oven gas, which is combusted to heat the coke ovens and for other uses.

Biological treatment of cokemaking wastewater can potentially emit HAPs if significant concentrations of volatile organic compounds (VOCs) are present. To estimate the

maximum air emissions from biological treatment, EPA multiplied the individual concentrations of all VOCs in cokemaking wastewater entering the biological treatment system by the maximum design flow (2.52 million gallons per day) and the maximum operational period (365 days/year) reported in the industry surveys to determine annual VOC loadings to the biological treatment unit. The Agency determined the concentrations of the individual VOCs entering the biological treatment system from the EPA sampling data. Table 13-3 shows the average influent concentration of the individual VOCs and the annual pollutant loadings based on a biological treatment system influent flow of 1,750 gallons per minute. Even with the conservative assumption that all the VOCs entering the biological treatment system are emitted to the atmosphere (no biological degradation), the maximum VOC emission rate would be approximately 1,800 pounds or 0.9 tons per year. This is well below threshold levels that would classify the site as a major source of VOCs (i.e., 25 tons for the combination of all HAPs, or 10 tons for any individual HAP).

For integrated and non-integrated steelmaking operations, the only organic pollutant of concern (POC) detected in untreated basic oxygen furnace (BOF) wastewater from stainless steel product manufacturing was phenol. Phenol was detected at relatively low concentrations (0.012 mg/L to 0.33 mg/L). Because phenol is a semivolatile organic compound with a low Henry's Law constant, it is not expected to partition to the air. No volatile pollutants of concern were detected in any of the steelmaking wastewater. The other primary pollutants in the steelmaking process wastewater are suspended solids, dissolved metals, and oils. Under ambient conditions, these pollutants show insignificant volatilization because of their vapor pressure, even in open-top treatment units.

Wet air pollution control (WAPC) equipment is commonly used in a number of the iron and steel subcategories to control air emissions. None of the proposed pollution prevention, recycling, or wastewater technology options will have a negative impact on the performance of these WAPC systems. In fact, some of the proposed pollution prevention alternatives may enhance the performance of these systems by reducing pollutant loadings. Therefore, EPA does not expect any adverse air impacts to occur as a result of the proposed regulation.

13.3 Solid Waste Impacts

A number of the proposed treatment technologies will generate solid waste, including Resource Conservation and Recovery Act (RCRA) hazardous and nonhazardous sludge and waste oil. Most solid waste generated by the iron and steel industry is nonhazardous, except for certain treatment sludges generated by electroplating operations in the steel finishing industry and iron-cyanide sludge generated during treatment of cokemaking wastewater. Nonhazardous solid wastes include sludge from biological treatment systems for cokemaking wastewater and sludge from multimedia filtration, chemical precipitation, and clarification systems from iron and steelmaking wastewater. Federal and state regulations require iron and steel facilities to manage their RCRA hazardous and nonhazardous sludges to prevent releases to the environment.

The following subsections provide both current sludge generation rates estimated from the industry surveys and the incremental increases expected as a result of the proposed

regulation for each iron and steel subcategory. Incremental increases in sludge generation are based on the pollutant loading and removal information provided in Section 10. Based on the information summarized in Table 13-1, EPA estimates that annual sludge generation across the entire iron and steel industry will increase by 0.5 percent as a result of the proposed regulation.

13.3.1 Cokemaking Subcategory

Biological nitrification, proposed as the primary technology basis for ammonia, phenolics, and biochemical oxygen demand (BOD) removal from cokemaking wastewater, combined with technologies such as cyanide precipitation and multimedia filtration, will produce a wastewater treatment sludge requiring disposal or further processing. Table 13-4 shows additional sludge generation for the entire cokemaking industry by technology option.

EPA estimates that compliance with BAT-1 and BAT-3 will generate approximately 130 tons (dry) per year of additional biological treatment sludge. BAT-3 adds alkaline chlorination following biological treatment to remove residual cyanide and ammonia to BAT-1; however, alkaline chlorination is not expected to generate significant amounts of additional sludge. Based on the industry survey data, EPA estimates that the cokemaking industry currently generates more than 23,000 tons per year (dry) of biological treatment sludge. As such, the increased biological treatment sludge generated by the BAT-1 and BAT-3 treatment options is approximately 0.6 percent of the total sludge currently generated by the industry.

Sludge generation calculated for BAT-2 is a result of both biological treatment for ammonia, phenolics, and BOD removal and chemical precipitation to remove cyanide. Based on the pollutant loading and removal data presented in Section 10, EPA estimates that compliance with BAT-2 will generate an additional 12 tons per year (dry) of iron-cyanide sludge, in addition to the 130 tons per year (dry) of biological treatment sludge. Based on the industry survey data, EPA estimates that the cokemaking industry currently generates approximately 460 tons per year (dry) of iron-cyanide sludge. Compliance with BAT-2 will increase iron-cyanide sludge production throughout the cokemaking industry by 3 percent. The nonhazardous biological treatment sludge can be disposed of in a Subtitle D landfill, recycled to the coke ovens for incineration, or land applied. Depending on RCRA hazardous characterization results (40 CFR 262.11), iron-cyanide sludge collected from the cyanide precipitation process may be disposed of in a Subtitle C or Subtitle D landfill.

BAT-4 generates the largest amount of sludge, 370 tons per year (dry), due to the removal and treatment of total suspended solids (TSS) by the multimedia filters following biological treatment and alkaline chlorination.

EPA does not expect any of the eight indirect dischargers to install additional equipment to comply with PSES-1 (tar removal, flow equalization and ammonia distillation) and, therefore, no additional sludge is expected. EPA estimates that four facilities will add cyanide precipitation and multimedia filtration to comply with PSES-2 generating approximately 100 tons per year (dry) of additional sludges. The Agency expects approximately 2,990 additional tons of

sludge per year (dry) to be generated, based on five facilities installing new biological treatment systems to comply with PSES-3 and PSES-4.

Neither of the two non-recovery cokemaking facilities generate wastewater and, therefore, are not expected to generate additional sludge.

Table 13-1 shows that the selected options (BAT-3 and PSES-3) would increase biological sludge generation by approximately 3,100 tons per year. Information provided in the industry survey shows that 65 percent of all biological sludge is sent to the coke batteries for incineration, while 15 percent is land applied and 20 percent is landfilled.

13.3.2 Ironmaking Subcategory

Additional wastewater treatment sludge will be generated by the blast furnace ironmaking and sintering operations as a result of compliance with both BAT-1 and PSES-1. BAT-1, which includes solids removal in the high-rate recycle system, as well as chemical precipitation, settling, and multimedia filtration for treatment of blowdown water, will generate approximately 4,430 additional tons/year (dry) of wastewater treatment sludge, as shown in Table 13-4. PSES-1, which includes the same solids-generating treatment units as BAT-1, with the exception of multimedia filtration following chemical precipitation and settling of high-rate recycle blowdown, is expected to generate an additional 230 tons per year (dry) of wastewater treatment sludge.

The data provided in Table 13-1 shows that blast furnace ironmaking and sintering operations generated approximately 86,000 tons (dry) of mill scale, grit, and sludge in 1997. The proposed BAT-1 and PSES-1 options for blast furnace ironmaking and sintering would increase annual sludge generation by 4,700 tons/year, an increase of approximately 5 percent. Information provided in the industry surveys shows that 36 percent of the mill scale and sludges generated by the Ironmaking Subcategory is disposed of by landfilling. The remainder is recycled to sinter or briquetting, or sent off site to a commercial recycler.

13.3.3 Integrated Steelmaking Subcategory

To comply with the proposed BAT-1 effluent limits, EPA estimates that one direct discharger will install a new continuous caster recycle water system and nine facilities will install chemical precipitation to treat blowdown water, resulting in additional 3,560 tons/year (dry) of wastewater treatment sludge (Table 13-4). Indirect discharging integrated steelmaking facilities have the model equipment in place and, therefore, EPA does not expect them to generate additional sludge. As shown in Table 13-1, integrated steelmaking operations currently generate approximately 940,000 tons/year of mill scale, sludges, and filter cakes. The additional generation of sludge represents a 0.4 percent increase.

13.3.4 Integrated Steelmaking and Stand-Alone Hot Forming Subcategory

To comply with the proposed BAT-1 effluent limits, the Agency estimates that 12 sites will install high-rate recycle systems to replace existing partial or once-through treatment systems. EPA estimates that two of these mills will install new recycle systems consisting of roughing clarifiers and multimedia filters that will generate sludges. EPA also estimates that another seven facilities manufacturing carbon steel products will install multimedia filtration systems to remove suspended solids and metals from recycle system blowdown water. Treatment of multimedia filter backwash water will produce an additional 12,500 tons/year of wastewater treatment sludge (Table 13-4). EPA estimates that, to comply with PSES-1, a carbon steel manufacturing facility will install a new multimedia filter. A stainless steel manufacturing facility will install a roughing clarifier and multimedia filter, generating an additional 930 tons per year of sludge.

Incremental sludge production (Table 13-1) is estimated to be 12,500 tons per year or a 5 percent increase over the current mill scale, sludge, and filter cake production amounts generated by this subcategory.

13.3.5 Non-Integrated and Stand-Alone Hot Forming Subcategory

EPA estimates that 13 carbon and stainless steel sites will install multimedia filtration systems as a result of the regulation. The Agency also estimates that two non-integrated steelmaking and hot forming facilities manufacturing carbon products will install new high-rate recycle systems as well as multimedia filters for blowdown treatment to meet BAT-1 requirements. These solids removal systems are expected to generate an additional 1,300 tons/year of dry wastewater treatment sludge, as shown in Table 13-4.

EPA is proposing to revise PSES-1 for non-integrated and stand-alone hot forming operations manufacturing stainless steel products. EPA estimates that an additional 70 tons per year of treatment sludge will be generated by three non-integrated and stand-alone hot forming operations manufacturing stainless steel products, based on the pollutant loading and removal data presented in Section 10. Additional sludge generation is a result of improved treatment performance for existing treatment systems.

Treatment sludges from BAT-1 and PSES-1 will increase solid waste production by approximately 0.05 percent over the current 2,537,000 tons per year (see Table 13-1).

13.3.6 Steel Finishing Subcategory

Both RCRA hazardous and nonhazardous sludges are generated at steel finishing facilities. RCRA sludge may be classified as hazardous as a result of listing or characterization based on the following information:

- If the site performs electroplating operations, the sludge resulting from treatment of this wastewater is a RCRA F006 listed hazardous waste (40

CFR 260.11). If wastewater from other operations is mixed with the electroplating wastewater and treated, all sludges generated from the treatment of the combined wastewater are also RCRA F006 listed hazardous wastes.

- Sludge generated from the treatment of wastewater associated with tin plating on carbon steel and zinc plating on carbon steel is not a RCRA listed hazardous waste.

- If the sludge from wastewater treatment exceeds the standards for the Toxicity Characteristic Leaching Procedure (i.e., is hazardous), or exhibits other RCRA-defined hazardous characteristics (i.e., reactive, corrosive, or flammable), it is considered a characteristic hazardous waste (40 CFR 261.24).

Based on information collected during site visits and sampling episodes to iron and steel operations, the Agency believes that the majority of sludge generated at steel finishing sites would not be classified as hazardous. Information provided in the industry surveys indicates that less than 5 percent of the total sludges and solid waste generated by finishing facilities is hazardous under RCRA.

For carbon and alloy and stainless steel finishing sites, BAT-1 consists of in-process controls to limit water usage and recycle process chemicals, plus end-of-pipe wastewater treatment. Wastewater treatment includes oil removal, chromium reduction when necessary, multiple-stage pH control for metals precipitation, and solids removal by gravity clarification. EPA estimates that the 69 direct discharging steel finishing facilities (both carbon and alloy and stainless steel) will improve the performance of their metals removal systems, resulting in approximately 2,200 tons per year (dry) of additional treatment sludge (Table 13-4). For PSES-1, EPA estimates that an additional 77 tons per year of wastewater treatment sludge will be generated as a result of six steel finishing facilities installing chemical precipitation and/or clarification systems.

EPA estimates steel finishing facilities currently generate over 690,000 tons per year (dry) of sludge. The proposed BAT-1 option for steel finishing would increase annual sludge generation by approximately 0.3 percent.

13.3.7 Other Operations Subcategory

Other operations include DRI, forging, and briquetting processes. Based on the current equipment in place at DRI and forging facilities, EPA believes that one DRI facility complying with BPT will generate additional sludge; however, the amount of sludge generated cannot be disclosed because it contains confidential business information.

13.4 References

13-1. Perry's Chemical Engineers Handbook, Sixth Edition. McGraw Hill Press, 1984.

13-2. Energy Information Administration. Electric Power Annual 1998 Volume I, Table A1.

Table 13-1

Summary of Pollutant Removals, Energy Requirements, and Sludge Generation for the Selected Option by Subcategory

Energy Usage and Sludge Generation	Subcategory							
	Cokemaking	**Ironmaking**	**Integrated Steelmaking**	**Integrated and Stand-Alone Hot Forming[a]**	**Non-Integrated Steelmaking and Hot Forming[a]**	**Steel Finishing[a]**	**Other**	**Total**
Selected options	BAT-3 PSES-3	BAT-1 PSES-1	BAT-1 PSES-1	BAT-1	BAT-1 PSES-1[b]	BAT-1	BPT PSES-1	NA
Current energy usage[c] (million kilowatt hours/year)	101	520	520	580	350	840	280	3,191
Incremental energy usage (million kilowatt hours/year)	33	11	8	169	8	2	nd	231
% increase in energy requirement	22	2	1.5	29	2.4	0.2	0	7
Current sludge generation[c] (tons/year)	23,000	86,000	940,000	273,000	2,537,000	690,000	664,000	5,189,000
Incremental sludge generation (tons/year)	3,100	4,700	3,600	12,500	1,400	2,200	nd	27,500
% increase in sludge generation	14	5	0.4	5	0.05	0.3	2	0.5

[a]Includes carbon, alloy, and stainless steel manufacturing.
[b]PSES for stainless steel manufacturing only.
[c]U.S. EPA, U.S. EPA Collection of 1997 Iron and Steel Industry Survey (Detailed and Short Surveys).
NA - Not applicable.
nd - Not disclosed because it contains confidential business information.

Table 13-2

Incremental Energy Requirements by Subcategory and Option

Subcategory	Incremental Energy Required (million kWh/yr)							
	BAT-1	**BAT-2**	**BAT-3**	**BAT-4**	**PSES-1**	**PSES-2**	**PSES-3**	**PSES-4**
Cokemaking	5	5	21	24	0	0.3	12	17
Ironmaking	11	NA	NA	NA	0	0.08	NA	NA
Integrated Steelmaking	8	NA	NA	NA	0	NA	NA	NA
Integrated and Stand-Alone Hot Forming[a]	169	NA	NA	NA	1	NA	NA	NA
Non-Integrated Steelmaking and Hot Forming	8[a]	NA	NA	NA	0[b]	NA	NA	NA
Steel Finishing[a]	2	NA	NA	NA	0.1	NA	NA	NA
Other[c]	0[d]	NA	NA	NA	NA	NA	NA	NA

[a]Includes carbon, alloy, and stainless steel products.
[b]Stainless steel products only.
[c]Other operations include direct reduced iron (DRI), briquetting, and forging. Of these segments, DRI would require additional energy for BPT; however, the incremental requirement contains confidential business information and cannot be presented.
[d]Based on BPT for direct reduced iron and forging.
NA - Not applicable.

Table 13-3

Estimated Maximum VOC Emission Rate From Biological Treatment of Cokemaking Wastewater

Compound	Influent Concentration (mg/L)[a]	Flow Rate (gpm)[b]	Estimated Emission Rate (lbs/yr)
Benzene	nd	nd	nd
Acetone	nd	nd	nd
Acrylonitrile	nd	nd	nd
Carbon disulfide	nd	nd	nd
1,1,2,2-TCA	nd	nd	nd
Total			**1,808**

[a]U.S. EPA Iron and Steel Industry Wastewater Sampling Program, 1997-1999.
[b]U.S. EPA, U.S. EPA Collection of 1997 Iron and Steel Industry Data (Detailed and Short Surveys).
nd - Not disclosed to prevent compromising confidential business information.

Table 13-4

Incremental Sludge Generation by Subcategory and Option

Subcategory	Incremental Sludge Generation (tons/year dry)							
	BAT-1	**BAT-2**	**BAT-3**	**BAT-4**	**PSES-1**	**PSES-2**	**PSES-3**	**PSES-4**
Cokemaking	130	142	130	370	0	100	2,990	2,990
Ironmaking	4,430	NA	NA	NA	230	NA	NA	NA
Integrated Steelmaking	3,560	NA	NA	NA	0	NA	NA	NA
Integrated and Stand-Alone Hot Forming[a]	12,500	NA	NA	NA	930	NA	NA	NA
Non-Integrated Steelmaking and Hot Forming	1,300[a]	NA	NA	NA	70[b]	NA	NA	NA
Steel Finishing[a]	2,180	NA	NA	NA	77	NA	NA	NA
Other[c]	0[d]	NA	NA	NA	NA	NA	NA	NA

[a]Includes carbon, alloy and stainless steel products.
[b]Stainless steel products only.
[c]Other operations include DRI, briquetting, and forging. Of these segments, DRI would generate additional sludge; however, the incremental sludge generation contains confidential business information and cannot be presented.
[d]BPT for DRI and forging.
NA - Not applicable.

SECTION 14

SELECTED OPTIONS AND PROPOSED EFFLUENT LIMITATIONS AND STANDARDS

As discussed in Section 2, EPA must promulgate six types of effluent limitations guidelines and standards for each major industrial category, as appropriate:

- Best Practicable Control Technology Currently Available (BPT);
- Best Control Technology for Conventional Pollutants (BCT);
- Best Available Technology Economically Achievable (BAT);
- New Source Performance Standards (NSPS);
- Pretreatment Standards for Existing Sources (PSES); and
- Pretreatment Standards for New Sources (PSNS).

BPT, BCT, BAT and NSPS limitations regulate only those sources that discharge effluent directly into waters of the United States. PSES and PSNS limitations restrict pollutant discharges for those sources that discharge effluent indirectly through sewers flowing to publicly owned treatment works (POTWs). Sections 14.1 and 14.2 discuss BPT and BCT effluent limitations guidelines, respectively. Section 14.3 discusses BAT, NSPS, PSES, and PSNS technology bases and effluent limitations guidelines and standards.

14.1 BPT

As discussed in Section 2, BPT generally represents the average of the best performances of facilities within the industry, grouped to reflect various ages, sizes, processes, or other common characteristics. BPT focuses on end-of-pipe treatment rather than process changes or internal controls, except when the process changes or internal controls are common industry practice. EPA is required under Section 304(b) of the Clean Water Act (CWA) to perform a limited cost-benefit balance when setting BPT limitations to ensure that costs are not wholly out of proportion to the effluent reduction benefits achieved; the Agency is not required to quantify benefits in monetary terms. See Weyerhaueser Company v. Costle, 590 F.2d 1011 (D.C. Cir. 1978). When balancing BPT costs with effluent reduction benefits, EPA considers the volume and nature of existing wastewater discharges, the volume and nature of discharges expected after the application of BPT, the general environmental effects of pollutants discharged, and the cost and economic impact of required pollution control.

14.1.1 Manufacturing Operations New to the Iron and Steel Category

EPA is proposing BPT limitations for non-recovery cokemaking, sintering operations with dry air pollution controls, direct reduced ironmaking, briquetting, and forging operations because there are no BPT limitations in the 1982 Iron and Steel regulation applicable to these operations.

The Agency is proposing zero discharge of process wastewater pollutants to waters of the United States as the BPT limitations for non-recovery cokemaking, sintering operations with dry air pollution controls, and briquetting.

The proposed BPT limitations for the Direct Reduced Ironmaking Segment of the Other Operations Subcategory are based on model treatment consisting of solids removal, clarification, high-rate recycle, and blowdown filtration. EPA set BPT limitations for total suspended solids (TSS); the Agency has determined that the controlling TSS will incidentally remove all other pollutants of concern (POCs) considered for regulation in this subcategory, including oil and grease (O&G). EPA estimates that application of the proposed BPT limitations would result in no facility closures. The following table presents the proposed BPT limitations.

Other Operations Subcategory
BPT Limitations for Direct Reduced Ironmaking Segment

Pollutant	BPT Limitations (lbs/ton of product)	
	Maximum Daily	Maximum Monthly Average
Total suspended solids (TSS)	0.0200	0.00929

The proposed BPT limitations for the Forging Segment of the Other Operations Subcategory are based on high-rate recycle and oil/water separation. EPA estimates that application of the proposed BPT limitations would result in a 72 percent reduction of O&G in direct discharges from forging operations, with no facility closures. The following table presents the proposed BPT limitations.

Other Operations Subcategory
BPT Limitations for Forging Segment

Pollutant	BPT Limitations (lbs/ton of product)	
	Maximum Daily	Maximum Monthly Average
Oil and grease (O&G)	0.0149	0.00889
Total suspended solids (TSS)	0.0235	0.0118

14.1.2 Manufacturing Operations Currently Regulated

For manufacturing operations currently subject to BPT limitations in the 1982 rule, the Agency is not proposing to revise BPT limitations for TSS and O&G. Table 14-1 presents these BPT limitations. For electric arc furnace (EAF) operations, the 1982 Steelmaking Subcategory requires zero discharge for BPT in the semi-wet operations but allows discharge for BPT in the wet operations. Since wet EAFs no longer exist in the United States, the proposed

rule is requiring zero discharge for all EAFs. For continuous electroplating operations currently subject to BPT limitations under 40 CFR Part 433 but proposed for regulation under the revised iron and steel rule, EPA has assigned BPT limitations for TSS and O&G based on the limitations at Part 433 for those operations.

EPA recognizes the difficulty in implementing the proposed regulation if BPT limitations remain unchanged and reflect a different subcategorization: permit writers and industry representatives would be required to implement the existing 40 CFR Part 433 BPT limitations for electroplating and the 1982 iron and steel BPT limitations for 12 subcategories and more than 50 segments, in addition to the proposed BAT limitations for 7 subcategories and far fewer segments. Consequently, EPA developed the following alternative approach for codifying BPT limits. EPA solicits comment on this alternative approach.

Alternative Approach: Codify BPT Limitations as the TSS and O&G Concentrations Used to Develop the 1982 Iron and Steel Rule

To simplify the Iron and Steel regulation and ease the implementation of BPT limitations in the National Pollutant Discharge Elimination System (NPDES) permit program, EPA is considering replacing the 1982 mass-based BPT limitations for TSS and O&G with corresponding concentration-based limitations. The concentration-based BPT limitations would equal the treated effluent concentrations used to develop the 1982 regulation for all operations that EPA proposes to regulate under the Iron and Steel rule. These concentrations are shown as the daily maximum and maximum monthly average TSS and O&G concentrations (mg/L) for the 12 subcategories of the 1982 regulation (Reference 14-1). For electroplating operations currently regulated under Part 433, EPA would set the corresponding BPT concentration limitations equal to either the concentrations at Part 433 or the concentrations for steel finishing operations in the 1982 regulation (Reference 14-1).

Under this alternative approach, the TSS and O&G concentrations from the 1982 regulation would be codified as BPT limitations in the seven subcategories of the proposed regulation to simplify the regulation and ease implementation. Permit writers and industry representatives would not have to then classify operations under both the complicated subcategorization and segmentation of the 1982 regulation and the less complicated subcategorization and segmentation of the proposed regulation.

Under this alternative approach, permit writers would develop NPDES permit effluent limitations by first applying the corresponding BAT limitations for priority and nonconventional pollutants for each internal or external process wastewater outfall. Then, the permit writer would develop mass effluent limitations for TSS and O&G by applying the respective concentration-based BPT effluent limitations guidelines to a reasonable measure of actual process wastewater discharge flow, taking into account process wastewater regulated by the Iron and Steel rule and process wastewater that may be unregulated by the Iron and Steel rule (see proposed regulation at 40 CFR Part 420.03(f)). As with BAT limitations, the Agency intends that only the mass limitations derived for TSS and O&G as described above should be included in NPDES permits.

Depending upon site-specific circumstances, this alternative approach could result in either more or less stringent limitations for TSS and O&G than would be derived from the 1982 BPT limitations. For example, if a facility has (1) process wastewater discharge flow rates that are lower than the model BPT production-normalized flow rates used to develop the 1982 regulation and (2) no unregulated process wastewater, the resulting TSS and O&G permit limitations would be more stringent in proportion to the lower discharge flow. On the other hand, if the facility had higher process wastewater discharge flow rates or a substantial volume of unregulated process wastewater, the resulting effluent limitations would be higher in proportion to the higher discharge flow. The Agency has determined that, in many instances, the volume of regulated process wastewater that is either currently discharged or will be discharged to comply with BAT limitations will be somewhat less than model BPT flow rates. Consequently, EPA expects that the resulting NPDES permit effluent limitations for TSS and O&G will be somewhat more stringent but still within the range of those derived from the current BPT limitations.

The Agency has determined that there would be no additional costs to comply with NPDES permit effluent limitations derived with this alternative approach. To calculate the costs to achieve BPT limitations, EPA considered both the incremental investment costs and incremental operation and maintenance costs to achieve BAT limitations, where appropriate. EPA would not expect facilities to incur additional monitoring costs associated with concentration-based BPT limitations because facilities already monitor for these pollutants under the 1982 regulation; EPA does not propose to establish any new monitoring requirements for conventional pollutants. Nonetheless, for the purpose of calculating the cost per pound of conventional pollutants removed, EPA estimated both the costs associated with implementing BPT technologies (even though they are already subsumed in the BAT costs) and the total pounds of pollutants removed by these technologies. The estimated costs and removals reflect only the subcategories and segments for which EPA is considering revising BPT limitations. The total estimated cost is $53.8 million (1997 pretax total annualized cost[1]) for a total estimated removal of 30.3 million pounds of conventional pollutants. EPA determined that the total cost is reasonable in relation to the effluent reduction benefits. If EPA were to adopt this alternative approach, the Agency would revise BCT limitations to reflect the new BPT levels because nothing more stringent than those levels appears to pass the BCT cost-reasonableness test. (See Section 14.2 for more information on BCT limitations).

14.2 BCT

As discussed in Section 2, the BCT methodology promulgated in 1986 (51 FR 24974) sets forth the Agency's consideration of costs in establishing BCT effluent limitations guidelines. BCT is not an additional set of limitations; it replaces BAT for the control of conventional pollutants. EPA evaluates the reasonableness of BCT candidate technologies (those that are technologically feasible) by applying a two-part cost reasonableness test:

[1]EPA annualized the costs presented in Section 9 for presentation in this section (Reference 14-2).

- POTW test: EPA calculates the cost per pound of conventional pollutant removed by industrial dischargers in upgrading from BPT to a BCT candidate technology, and then compares this cost to the cost per pound of conventional pollutant removed in upgrading POTWs from secondary treatment. The upgrade cost to industry must be less than the POTW benchmark of $0.25 per pound (in 1976 dollars).

- Industry cost-effectiveness test: The ratio of the incremental BPT to BCT cost divided by the BPT cost for the industry must be less than 1.29 (i.e., the cost increase must be less than 29 percent).

EPA may propose BCT limitations only if a candidate BCT technology passes both parts of the cost-reasonableness test.

In developing BCT limitations for the Iron and Steel Category, EPA considered whether any existing technologies achieve greater removals of conventional pollutants than the technologies that form the basis for BPT and whether those technologies are cost-reasonable according to the prescribed BCT cost test. The Agency identified no existing technologies that (1) achieve greater removals of conventional pollutants than the technologies that form the basis for BPT and (2) pass the BCT cost-reasonableness test. Accordingly, EPA proposes to establish BCT effluent limitations that are equal to BPT limitations in the 1982 Iron and Steel rule. For non-recovery cokemaking, sintering operations with dry air pollution controls, direct reduced ironmaking, briquetting, and forging operations, EPA proposes to establish BCT effluent limitations that are equal to the BPT limitations the Agency is proposing for these operations. (See Section 14.1 for more information on BPT limitations.)

14.3 BAT, NSPS, PSES, and PSNS

Sections 14.3.1 through 14.3.7 discuss the selected technology options and corresponding mass-based effluent limitations guidelines and standards for each iron and steel subcategory. EPA developed these proposed effluent limitations guidelines and standards using production-normalized flow rates and long-term effluent data corresponding to selected technology options. For more information on the evaluation of production-normalized flow rate and long-term average data, refer to Sections 7 and 12. The overall technology bases for the development of BAT, NSPS, PSES, and PSNS are discussed below.

BAT

As discussed in Section 2, BAT represents the best economically achievable performance of facilities in an industrial category. BAT may include process changes or internal controls, even when they are not common industry practice. The statutory assessment of BAT considers costs but does not require a balance of costs with effluent reduction benefits. See Weyerhauser Company v. Costle, 590 F.2d 1011 (D.C. Cir. 1978). EPA has, however, given substantial weight to the reasonableness of costs in developing BAT limitations. The Agency considered the volume and nature of existing wastewater discharges, the volume and nature of

discharges expected after the application of BAT, the general environmental effects of pollutants discharged, and the cost and economic impact of required pollution control. Despite this expanded consideration of costs, the primary determinant of BAT is effluent reduction capability. Under the CWA, the achievement of BAT has become the principal national means of controlling toxic water pollution.

EPA has determined that the selected BAT model technologies (discussed in Section 8) are technically feasible and economically achievable (Reference 14-2) for the respective segments to which they apply. EPA has determined, for the reasons described in Section 13, that none of the proposed technology options presents unacceptable adverse non-water quality environmental impacts. EPA considered age, size, processes, and other engineering factors pertinent to facilities in the proposed segments when evaluating technology options. None of these factors provided a basis for selecting different technologies than those EPA proposes as its model BAT technologies.

NSPS

As discussed in Section 2, NSPS reflect effluent reductions that are achievable based on the best available demonstrated control technology. EPA is required to consider the best demonstrated process changes, in-plant controls, and end-of-pipe treatment technologies to reduce pollution to the maximum extent feasible for NSPS. For the proposed Iron and Steel rule, the Agency generally considered BAT model treatment systems to be the demonstrated NSPS model treatment systems because most of the BATs are considered to represent the best demonstrated technologies.

In selecting its proposed NSPS technologies, EPA considered all of the factors specified in CWA Section 306, including the cost of achieving effluent reductions. The model NSPS technologies that form the basis for the proposed standards are well demonstrated and used within the iron and steel industry. Based on this demonstration, EPA has concluded that costs associated with implementing NSPS do not present a barrier to entry. The Agency also considered energy requirements and other non-water quality environmental impacts for the proposed NSPS options and concluded that these impacts are acceptable and no greater than the impacts expected from the proposed BAT technology options. EPA, therefore, concluded that the proposed NSPS constitute the best available demonstrated control technology.

PSES/PSNS

As discussed in Section 2, PSES and PSNS are designed to prevent the discharge of pollutants that pass through, interfere with, or are otherwise incompatible with the operation of POTWs. EPA has determined that several priority and nonconventional pollutants present in untreated iron and steel industry process wastewater pass through POTWs and may limit POTW sludge disposal alternatives or interfere with biological treatment at POTWs. (See Section 11 for more information on the Agency's POTW pass-through analyses.) Accordingly, EPA is proposing pretreatment standards for metals and other priority and nonconventional pollutants. When developing pretreatment standards, EPA considered the cost of achieving effluent

reductions, the age and size of equipment and facilities involved, the processes employed, potential process changes, the location of facilities, non-water quality environmental impacts (including energy requirements), and the engineering aspects of applying pretreatment technologies in relation to the POTWs. None of these factors provided a basis for selecting different technologies than those EPA proposes as its model PSES technologies.

The Agency is proposing PSNS based on the same considerations made for PSES. EPA considered all of the factors specified in CWA Section 306, including the cost of achieving effluent reductions, when selecting its proposed PSNS technologies. The model PSNS technologies that form the basis for the proposed standards are well demonstrated and used within the iron and steel industry. Based on this demonstration, EPA concluded that costs associated with implementing PSNS do not present a barrier to entry.

14.3.1 Cokemaking

BAT--By-Product Recovery Segment

EPA is proposing BAT-3 for the By-Product Recovery Segment of the Cokemaking Subcategory. The BAT-3 model treatment sequence consists of oil and tar removal, flow equalization prior to ammonia stripping, free and fixed ammonia stripping, indirect cooling, flow equalization before biological treatment, biological treatment, sludge dewatering, and alkaline chlorination.

As discussed in Section 8, EPA evaluated four BAT options for the By-Product Recovery Segment. The Agency determined that each option would result in the following additional water usage reductions and pollutant removals:

- BAT-1 would reduce current annual water usage by 1.6 million gallons and increase the current removal of priority and nonconventional pollutants by 14 percent;
- BAT-2 would achieve the same flow reduction as BAT-1, but BAT-2 includes cyanide precipitation treatment that would increase the cyanide removal achieved through BAT-1 by 17 percent;
- BAT-3 would achieve the same flow reduction as BAT-1, but BAT-3 includes alkaline chlorination treatment that would increase the cyanide removal achieved through BAT-1 by 50 percent; and
- BAT-4 would achieve the same flow reduction as BAT-1 and pollutant removals that are nearly equivalent to those achieved through BAT-3.

The Agency determined that each BAT option would result in the following additional annual pollutant removals (in toxic pound equivalents[2]) and associated compliance costs (in 1997 dollars):

- BAT-1 would remove 56,300 toxic pound equivalents per year at an annualized compliance cost of $0.9 million. EPA estimates that BAT-1 would cause no facility closures.

- BAT-2 would increase the pollutant removal achieved through BAT-1 by 26 percent and increase the annualized compliance cost by $3.3 million. EPA estimates that BAT-2 would cause no facility closures.

- BAT-3 would remove 0.43 million toxic pound equivalents per year at an annualized compliance cost of $8.6 million. EPA estimates that BAT-3 would cause one facility closure.

- BAT-4 would achieve pollutant removals that are nearly equivalent to those achieved through BAT-3 at an annualized compliance cost of $15.2 million. EPA estimates that BAT-4 would cause one facility closure.

EPA determined that all four BAT options are economically achievable (Reference 14-2). The Agency did not select BAT-1 or BAT-2 because BAT-3 would achieve higher pollutant removals at an economically achievable cost. EPA did not select BAT-4 because BAT-3 achieves nearly equivalent pollutant removals at a significantly lower cost. The Agency determined that BAT-3 is the best available technology economically achievable for the By-Product Recovery Segment of the Cokemaking Subcategory. The following table presents proposed BAT limitations.

[2]EPA converted the pollutant loads presented in Section 10 into toxic equivalents for the regulatory options presented in this section. The Agency estimated toxic-weighted pollutant removals by multiplying pounds of a pollutant removal by an assigned toxic weighting factor to obtain the "pound equivalent" pollutant removals. The assigned toxic weighting factor for each pollutant is based on the pollutant's relative toxicity to copper. The toxic weighting factors assigned to each pollutant of concern can be found in the Iron and Steel Administrative Record and the Economic Analysis of the Proposed Effluent Limitations Guidelines and Standards for the Iron and Steel Manufacturing Point Source Category (Reference 14-2).

Cokemaking Subcategory
BAT Limitations for By-Product Recovery Segment

Pollutant	BAT Limitations (lbs/ton of product)	
	Maximum Daily	**Maximum Monthly Average**
Ammonia as nitrogen	0.00137	0.000618
Benzo-*a*-pyrene	0.0000909	0.0000304
Cyanide	0.0104	0.00394
Mercury	0.000000864	0.000000523
Naphthalene	0.000103	0.0000345
Phenol	0.0000332	0.0000187
Selenium	0.000185	0.000159
Thiocyanate	0.00164	0.00115
Total residual chlorine[a]	0.000659	---

[a]Applicable only when chlorination is practiced.

EPA is proposing the following additional allowances for pollutant loadings based on the production-normalized flow for the treatment systems:

- Increased loadings, not to exceed 9.5 percent of the above limitations, for process wastewater from wet desulfurization systems if such systems generate process wastewater;

- Increased loadings, not to exceed 6.3 percent of the above limitations, for process wastewater from control measures necessary for compliance with by-product recovery coke plant National Emission Standards for Hazardous Air Pollutants (NESHAPs) if such systems generate process wastewater; and

- Increased loadings for process wastewater from other wet air pollution control systems (WAPCs) (not including coal charging and coke pushing emission controls), coal tar processing operations, and coke plant ground-water remediation systems if such systems generate process wastewater that is co-treated with by-product recovery cokemaking process wastewater.

See Section 7 for more information on the Agency's determination of these additional allowances for pollutant loadings.

NSPS--By-Product Recovery Segment

The treatment technologies that form the basis for NSPS for the By-Product Recovery Segment of the Cokemaking Subcategory are the same as the BAT-3 model technologies. EPA has determined that BAT-3 is the best demonstrated technology for new sources in the By-Product Recovery Segment; therefore, the Agency has set proposed NSPS limitations for the By-Product Segment equal to BAT-3 limitations (see previous table for BAT limitations). To ensure that the regulations for new sources represent the most stringent numerical values attainable through the application of the best available control technology for all pollutants, EPA is proposing NSPS limitations for two pollutants not regulated under BAT for the By-Product Recovery Segment: TSS and O&G. The following table presents these additional limitations.

Cokemaking Subcategory--By-Product Recovery Segment
NSPS Limitations for TSS and O&G[a]

Pollutant	New Source Performance Standards (lbs/ton of product)	
	Maximum Daily	**Maximum Monthly Average**
Oil and grease (O&G)	0.0246	0.0132
Total suspended solids (TSS)	0.0665	0.0337

[a]Proposed NSPS limitations for the By-Product Recovery Segment of the Cokemaking Subcategory include the BAT limitations presented in the previous table in addition to these limitations for TSS and O&G.

EPA is proposing the same additional allowances for proposed pollutant loadings for NSPS as the Agency is proposing for BAT.

PSES--By-Product Recovery Segment

EPA is co-proposing PSES-1 and PSES-3 for the By-Product Recovery Segment of the Cokemaking Subcategory. The PSES-1 model treatment sequence consists of tar removal, flow equalization, and free and fixed ammonia stripping. The PSES-3 model treatment sequence consists of oil and tar removal, flow equalization prior to ammonia stripping, free and fixed ammonia stripping, indirect cooling, flow equalization before biological treatment, biological treatment, and sludge dewatering.

As discussed in Section 8, EPA evaluated four PSES options for the By-Product Recovery Segment of the Cokemaking Subcategory. The Agency determined that the application of PSES options would result in the following additional annual pollutant removals (in toxic pound equivalents) and associated compliance costs (in 1997 dollars):

- PSES-1 would remove 3,400 toxic pound equivalents per year at an annualized compliance cost of $0.3 million;

- PSES-2 would increase the pollutant removal achieved through PSES-1 by 2,200 toxic pound equivalents per year and increase the annualized compliance cost by $1.9 million;

- PSES-3 would increase the pollutant removal achieved through PSES-2 by 42,900 toxic pound equivalents per year and increase the annualized compliance cost by $2.8 million; and

- PSES-4 would increase the pollutant removal achieved through PSES-3 by 2,900 toxic pound equivalents per year and increase the annualized compliance cost by $3.5 million.

In consideration of the significant additional costs required to achieve the pollutant removals under PSES-4, EPA determined that PSES-3 is the best technology option for the By-Product Recovery Segment. However, the Agency is co-proposing PSES-1 because this option may result in similar pollutant removals at a lower cost. Both options provide controls for POTW pass-through pollutants and are economically achievable (neither option would result in a facility closure). Between proposal and promulgation of the Iron and Steel rule, the Agency plans to further evaluate setting PSES equal to BAT-3, which contains the same technical components as PSES-4. The following table presents proposed PSES limitations for the By-Product Recovery Segment of the Cokemaking Subcategory.

Cokemaking Subcategory
PSES Limitations for By-Product Recovery Segment

	Pretreatment Standards for Existing Sources (lbs/ton of product)			
	Maximum Daily		Maximum Monthly Average	
Pollutant	PSES-1	PSES-3	PSES-1	PSES-3
Ammonia as nitrogen	0.0845	0.00539	0.0559	0.00357
Cyanide	0.0244	0.00616	0.0128	0.00422
Naphthalene	0.00268	0.000103	0.000869	0.0000345
Phenol	2.13	0.0000332	0.720	0.0000187
Selenium	0.00125	0.000185	0.00104	0.000159
Thiocyanate	0.402	0.00164	0.317	0.00115

EPA is proposing the same additional allowances for proposed pollutant loadings for PSES-3 as the Agency is proposing for BAT and NSPS. For PSES-1, EPA is proposing the following additional allowances for pollutant loadings based on the production-normalized flow for the treatment systems:

- Increased loadings, not to exceed 13.9 percent of the above limitations, for process wastewater from wet desulfurization systems if such systems generate process wastewater;

- Increased loadings, not to exceed 9.3 percent of the above limitations, for process wastewater from control measures necessary for compliance with by-product recovery coke plant NESHAPs if such systems generate process wastewater; and

- Increased loadings for process wastewater from other WAPC systems (not including coal charging and coke pushing emission controls), coal tar processing operations, and coke plant ground-water remediation systems if such systems generate process wastewater that is co-treated with by-product recovery cokemaking process wastewater.

PSNS--By-Product Recovery Segment

The treatment technologies that form the basis for PSNS for the By-Product Recovery Segment of the Cokemaking Subcategory are the same as the PSES-3 model technologies; therefore, EPA has set proposed PSNS limitations for the By-Product Recovery Segment equal to PSES-3 limitations (see previous table for PSES-3 limitations). EPA is also proposing the same additional allowances for proposed pollutant loadings for PSNS as the Agency is proposing for PSES. Between proposal and promulgation of the Iron and Steel rule, EPA plans to further evaluate setting PSNS equal to BAT-3, which has the same technical components as PSES-4.

BAT/NSPS/PSES/PSNS--Non-Recovery Segment

EPA has determined that non-recovery cokemaking operations do not discharge process wastewater. Process area storm water and nonprocess wastewater in the form of boiler blowdown are typically disposed of by coke quenching. Therefore, EPA is proposing zero discharge of process wastewater pollutants to waters of the United States and POTWs as BAT, NSPS, PSES, and PSNS for the Non-Recovery Segment of the Cokemaking Subcategory.

14.3.2 Ironmaking

BAT

EPA is proposing BAT-1 for the Ironmaking Subcategory. BAT-1 model treatment consists of high-rate recycle using a clarifier for solids removal, sludge dewatering, a cooling tower, and blowdown treatment with chemical precipitation for metals removal, alkaline chlorination, and multimedia filtration. The application of BAT-1 would reduce current annual water usage by 5 percent and reduce total loadings of priority and nonconventional pollutants by 68 percent. EPA has determined that BAT-1 is economically achievable (Reference 14-2); application of this option would cause no facility closures.

The proposed BAT limitations presented in the following tables apply to process wastewater from sintering operations with WAPCs and all blast furnace ironmaking operations, whether these wastewater discharges are treated separately or co-treated. Section 15 discusses the compliance monitoring point for 2,3,7,8-tetrachlorodibenzofuran (TCDF). The Agency is proposing zero discharge of process wastewater pollutants to waters of the U.S. as BAT for sintering operations with dry air pollution controls.

Ironmaking Subcategory
BAT Limitations for Sintering Operations[a]

Pollutant	BAT Limitations (lbs/ton of product)	
	Maximum Daily	**Maximum Monthly Average**
Ammonia as nitrogen	0.000652	0.000293
Cyanide	0.00493	0.00187
Lead	0.0000913	0.0000476
Phenol	0.0000463	0.0000157
2,3,7,8-TCDF	<ML[b]	---
Total residual chlorine[c]	0.000313	---
Zinc	0.000116	0.0000457

[a]BAT limitations in this table apply only to sintering operations with WAPCs.
[b]Ten parts per quadrillion (10×10^{-12} g/L).
[c]Applicable only when chlorination is practiced.

Ironmaking Subcategory
BAT/NSPS Limitations for Blast Furnace Operations

Pollutant	BAT/NSPS Limitations (lbs/ton of product)	
	Maximum Daily	**Maximum Monthly Average**
Ammonia as nitrogen	0.000217	0.0000977
Cyanide	0.00164	0.000623
Lead	0.0000304	0.0000159
Phenol	0.0000154	0.00000523
2,3,7,8-TCDF[a]	<ML[b]	---
Total residual chlorine[c]	0.000104	---
Zinc	0.0000387	0.0000152

[a]Applicable only when blast furnace process wastewater and sintering process wastewater discharges are co-treated.
[b]Ten parts per quadrillion ($10x10^{-12}$ g/L).
[c]Applicable only when chlorination is practiced.

NSPS

The treatment technologies that form the basis for NSPS for the Ironmaking Subcategory are the same as the BAT-1 model technologies. EPA has determined that BAT-1 is the best demonstrated technology for new sources in the Ironmaking Subcategory; therefore, EPA has set proposed NSPS limitations for the Ironmaking Subcategory equal to BAT-1 limitations (see previous table for BAT limitations). The Agency has determined that BAT-1 represents the best demonstrated technologies for the Ironmaking Subcategory. Section 15 discusses the compliance monitoring point for 2,3,7,8-TCDF. As with BAT, the Agency is proposing zero discharge of process wastewater pollutants to waters of the U.S. as NSPS for sintering operations with dry air pollution controls.

To ensure that the regulations for new sources represent the most stringent numerical values attainable through the application of the best available control technology for all pollutants, EPA is proposing NSPS limitations for two pollutants not regulated under BAT for the Ironmaking Subcategory: TSS and O&G. The following tables presents these additional limitations for sintering and blast furnace operations.

Ironmaking Subcategory--Sintering Operations[a]
NSPS Limitations for TSS and O&G[b]

Pollutant	New Source Performance Standards (lbs/ton of product)	
	Maximum Daily	Maximum Monthly Average
Oil and grease (O&G)	0.00531	0.00420
Total suspended solids (TSS)	0.0251	0.00939

[a]NSPS limitations in this table apply only to sintering operations with WAPCs.
[b]Proposed NSPS limitations for sintering operations in the Ironmaking Subcategory include the BAT limitations presented in the previous table for sintering operations in addition to these limitations for TSS and O&G.

Ironmaking Subcategory--Blast Furnace Operations
NSPS Limitations for TSS and O&G[a]

Pollutant	New Source Performance Standards (lbs/ton of product)	
	Maximum Daily	Maximum Monthly Average
Oil and grease (O&G)	0.00177	0.00140
Total suspended solids (TSS)	0.00836	0.00313

[a]Proposed NSPS limitations for blast furnace operations in the Ironmaking Subcategory include the BAT limitations presented in the previous table for blast furnace operations in addition to these limitations for TSS and O&G.

PSES

EPA is proposing PSES-1 for the Ironmaking Subcategory. PSES-1 model treatment consists of high-rate recycle using a clarifier for solids removal, sludge dewatering, a cooling tower, and blowdown treatment with chemical precipitation for metals removal. This option is economically achievable and provides controls for POTW pass-through pollutants. Section 15 discusses the compliance monitoring point for 2,3,7,8-TCDF.

Although setting PSES equal to BAT-1 would achieve additional removal of ammonia-N through alkaline chlorination, EPA has determined that all POTWs receiving wastewater from ironmaking operations are removing ammonia-N to levels comparable to the levels that would be achieved through BAT-1. Between proposal and promulgation of the Iron and Steel rule, the Agency plans to further evaluate setting PSES for the Ironmaking Subcategory equal to BAT-1. The Agency is proposing zero discharge of process wastewater pollutants to POTWs as PSES for sintering operations with dry air pollution controls.

The Agency is proposing regulatory flexibility to waive ammonia-N pretreatment standards for ironmaking operations if the indirect discharger certifies to its pretreatment control authority under 40 CFR 403.12 that it discharges process wastewater to a POTW with the capability to achieve ammonia-N removals that, when considered together with the indirect discharger's removals, are at least equivalent to those expected under proposed BAT.

Ironmaking Subcategory
PSES/PSNS Limitations for Sintering Operations[a]

Pollutant	Pretreatment Standards for Existing and New Sources (lbs/ton of product)	
	Maximum Daily	Maximum Monthly Average
Ammonia as nitrogen[b]	0.000652	0.000293
Lead	0.0000913	0.0000476
2,3,7,8-TCDF	<ML[c]	---
Zinc	0.000116	0.0000457

[a]PSES limitations in this table apply only to sintering operations with WAPCs.
[b]Not applicable when the discharger meets the requirements for a waiver of ammonia-N limitations.
[c]Ten parts per quadrillion ($10x10^{-12}$ g/L).

Ironmaking Subcategory
PSES/PSNS Limitations for Blast Furnace Operations

Pollutant	Pretreatment Standards for Existing and New Sources (lbs/ton of product)	
	Maximum Daily	**Maximum Monthly Average**
Ammonia as nitrogen[a]	0.000217	0.0000977
Lead	0.0000304	0.0000159
2,3,7,8-TCDF[b]	<ML[c]	---
Zinc	0.0000387	0.0000152

[a]Not applicable when the discharger meets the requirements for a waiver of ammonia-N limitations.
[b]Applicable only when blast furnace process wastewater and sintering process wastewater discharges are co-treated.
[c]Ten parts per quadrillion (10×10^{-12} g/L).

PSNS

The treatment technologies that form the basis for PSNS for the Ironmaking Subcategory are the same as the PSES-1 model technologies; therefore, EPA has set proposed PSNS limitations for the Ironmaking Subcategory equal to PSES-1 limitations (see previous tables for PSES limitations). Section 15 discusses the compliance monitoring point for 2,3,7,8-TCDF. The Agency's proposed waiver of pretreatment standards for ammonia-N applies to both PSES and PSNS (see the description of PSES for the Ironmaking Subcategory for more information). Between proposal and promulgation of the Iron and Steel rule, the Agency plans to further evaluate setting PSNS for the Ironmaking Subcategory equal to BAT-1. As with PSES, the Agency is proposing zero discharge of process wastewater pollutants to POTWs as PSNS for sintering operations with dry air pollution controls.

14.3.3 Integrated Steelmaking

BAT/NSPS/PSES/PSNS

EPA is proposing BAT-1 as BAT, NSPS, PSES, and PSNS for the Integrated Steelmaking Subcategory. BAT-1 model treatment consists of solids removal, scale pit with oil skimming (continuous casting only), sludge dewatering, multimedia filtration (continuous casting only), a cooling tower (vacuum degassing and continuous casting), high-rate recycle, and blowdown treatment with chemical precipitation for metals removal. The model technology option for process wastewater associated with vacuum degassing or continuous casting also includes cooling towers.

EPA has determined that BAT-1 represents the best demonstrated technology for BAT, NSPS, PSES, and PSNS for the Integrated Steelmaking Subcategory. The application of BAT-1 would reduce current annual water usage by 83 percent and reduce total loadings of priority and nonconventional pollutants by 66 percent. BAT-1 provides control of POTW pass-

through pollutants for PSES and PSNS. EPA has determined that BAT-1 is economically achievable (Reference 14-2); application of this option would cause no facility closures.

The following table presents proposed BAT, NSPS, PSES, and PSNS limitations for the Integrated Steelmaking Subcategory. These limitations apply to wastewater from basic oxygen furnaces with semi-wet, wet-suppressed combustion, or wet-open combustion pollution controls; vacuum degassing; and continuous casting operations conducted at integrated iron and steel mills. The limitations apply to wastewater discharges from these operations whether they are treated separately or co-treated. The Agency proposes zero discharge of process wastewater pollutants to waters of the United States and POTWs as BAT, NSPS, PSES, and PSNS for ladle metallurgy operations (other than vacuum degassing) in the Integrated Steelmaking Subcategory.

Integrated Steelmaking Subcategory
BAT/NSPS/PSES/PSNS Limitations

Pollutant	Limitations for BAT, NSPS, PSES, and PSNS (lbs/ton of product)	
	Maximum Daily	**Maximum Monthly Average**
Basic Oxygen Furnaces		
Semi-wet Air Pollution Controls		
Lead	0.0000122	0.00000634
Zinc	0.0000140	0.00000795
Wet-suppressed Combustion		
Lead	0.0000243	0.0000127
Zinc	0.0000279	0.0000159
Wet-open Combustion		
Lead	0.0000243	0.0000127
Zinc	0.0000279	0.0000159
Vacuum degassing		
Lead	0.0000183	0.00000951
Zinc	0.0000209	0.0000119
Continuous Casting		
Lead	0.0000243	0.0000127
Zinc	0.0000279	0.0000159

14.3.4 Integrated and Stand-Alone Hot Forming

BAT--Carbon and Alloy Segment

EPA is proposing BAT-1 for the Carbon and Alloy Steel Segment of the Integrated and Stand-Alone Hot Forming Subcategory. BAT-1 model treatment consists of high-rate recycle using a scale pit with oil skimming, a roughing clarifier with oil removal, sludge dewatering, a multimedia filter for polishing, and treatment of blowdown with multimedia filtration. The following table presents proposed BAT limitations for the Carbon and Alloy Steel Segment of the Integrated and Stand-Alone Hot Forming Subcategory.

Integrated and Stand-Alone Hot Forming Subcategory
BAT Limitations for Carbon and Alloy Steel Segment

Pollutant	BAT Limitations (lbs/ton of product)	
	Maximum Daily	Maximum Monthly Average
Lead	0.000122	0.0000634
Zinc	0.000131	0.0000907

EPA is proposing two different approaches for implementing BAT-1 for the Carbon and Alloy Steel Segment because the selected option may not be economically achievable in April 2002, when the Agency is scheduled to take final action on the proposed Iron and Steel rule. BAT Option A and BAT Option B differ in the amount of time facilities would have to achieve proposed BAT limitations.

Under BAT Option A, each existing direct discharger in the Carbon and Alloy Steel Segment would be subject to the proposed BAT limitations as soon these limitations are incorporated into the facility's NPDES permit, as required by CWA section 301(b)(2). The Agency has determined that BAT Option A is economically achievable; a facility-level economic analysis projects no facility closures. A firm-level economic analysis, however, does project that one or more firms may experience financial distress (e.g., loss of financial independence, sale of assets, or the likelihood of bankruptcy) as a result of the aggregate compliance costs--including the compliance costs for the Integrated and Stand-Alone Hot Forming Subcategory--of the Iron and Steel rule. The Agency's facility-level analysis indicates that facilities would be expected to remain viable after compliance and would possess value as continuing concerns. Therefore, EPA expects that a firm would respond to financial distress through the sale of assets, rather than through the declaration of bankruptcy, which is far more disruptive in terms of economic impacts on the subcategory as a whole. For example, job losses would be more limited and any community impacts associated with job losses would likewise be less severe from the sale of a facility owned by a distressed firm when compared with the impacts associated with a bankruptcy-induced closure. The Agency has determined that this projected level of financial distress is not

significant and, therefore, has determined that Option A is economically achievable for the Carbon and Alloy Steel Segment as a whole.

EPA has estimated that affected facilities could spend $21.2 million in total annualized costs to comply with BAT limitations based on BAT-1. When these costs are considered together with other estimated costs that firms could incur if the Iron and Steel rule is promulgated as proposed, the cumulative costs of the Iron and Steel rule could jeopardize the corporate financial health of one or more firms. While EPA considers these possible impacts acceptable for the proposed Iron and Steel rule, the Agency recognizes that new information received after proposal, including information regarding changes in the financial health of the industry due to changes in the national economy and foreign trade, might lead EPA to reach a different conclusion at promulgation in April 2002. Therefore, EPA is proposing a second BAT approach for the Carbon and Alloy Steel Segment.

BAT Option B is designed to minimize the possible adverse economic impacts of the proposed BAT option for the Carbon and Alloy Steel Segment of the Integrated and Stand-Alone Hot Forming Subcategory. The Agency is considering BAT Option B in the event that BAT Option A is not economically achievable for the Carbon and Alloy Steel Segment as a whole when the Iron and Steel rule is promulgated.

As described above, BAT Option A would make each existing direct discharger in the Carbon and Alloy Steel Segment subject to the proposed BAT limitations as soon these limitations are incorporated into the facility's NPDES permit. Although it is common practice for permit writers to concurrently issue administrative orders and permits based on a new or revised effluent guidelines, the decision to do so is left to the discretion of the permit writers. Therefore, EPA cannot assume the availability of such relief when estimating the costs and impacts of the proposed Iron and Steel rule. Under BAT Option B, existing direct dischargers in the Carbon and Alloy Steel Segment could receive additional time to comply with proposed BAT limitations.

Under BAT Option B, EPA would codify BAT limitations containing three separate components; these components would become progressively more stringent over time. Although applied in stages, the limitations would represent a continuum of progress that all facilities under BAT Option B would be required to achieve by a later date determined by the Agency. The three components are described below:

- **First component.** Each facility in the Carbon and Alloy Steel Segment would be immediately subject to "stage 1" BAT limitations for each regulated pollutant. These limitations would be based on the facility's existing effluent quality or the facility's current technology-based permit limitations, whichever would represent the more stringent limitations for each regulated pollutant. The Agency expects that the permitting authority would express "stage 1" BAT limitations in numeric format for each facility on a case-by-case basis. Existing effluent quality would be determined at the internal monitoring point for wastewater discharged from the hot forming wastewater treatment plant.

- **Second component.** Each facility in the Carbon and Alloy Steel Segment would be subject to enforceable interim milestones developed by the permitting authority on the basis of best professional judgment to reflect reasonable progress toward compliance with the "stage 2" BAT limitations. EPA intends that these milestones would be expressed as narrative or numeric conditions in the facility's NPDES permit and would reflect each step in a facility's progress toward achievement of "stage 2" performance requirements.

- **Third component.** Each facility in the Carbon and Alloy Steel Segment would be subject to the ultimate ("stage 2") BAT limitations based on the model BAT technology by a date determined by the Agency.

Under the first component, each facility would be subject to these limitations as soon as they were placed in the facility's NPDES permit. The "stage 1" BAT limitations would ensure that, at a minimum, existing effluent quality is maintained while each facility moves toward achieving "stage 2" BAT limitations. Because "stage 1" limitations would reflect a level of technology that is either already used or has been previously identified as BAT for each facility, EPA would conclude at promulgation that the technology bases for "stage 1" limitations are both technically available and economically achievable. If EPA were to promulgate such limitations, the Agency would consider whether the application of these limitations would result in any adverse non-water quality environmental impacts and would also consider the other statutory factors specified in CWA section 304(b)(2)(B) and 306. EPA believes that "stage 1" limitations would be the best available technology economically achievable for facilities in the Carbon and Alloy Steel Segment if compliance with these limitations allows these facilities to focus resources on the research, development, testing, and installation of technologies ultimately needed to achieve "stage 2" limitations. "Stage 1" limitations thus would reflect "reasonable further progress toward the national goal of eliminating the discharge of all pollutants," as called for by CWA section 301(b)(2)(A). "Stage 1" limitations would also reasonably represent the first component of the BAT continuum of progress if the Agency were to determine that the model BAT technology is not economically achievable at promulgation.

EPA would promulgate "stage 2" limitations based on the model BAT technology for the Carbon and Alloy Steel Segment. Under Option B, facilities would be subject to "stage 2" limitations by a later date set by the Agency (e.g., April 30, 2007). EPA would select a date by determining--based on the administrative record at promulgation--when the model BAT technology would be economically achievable for the Carbon and Alloy Steel Segment as a whole. Thus, if EPA concludes at the time of promulgation that five years would be sufficient time to allow facilities to raise the capital necessary to implement the model BAT technology in a way that ensures its economic achievability, then EPA would specify a "stage 2" compliance date five years from promulgation.

EPA recognizes that some facilities in the Carbon and Alloy Steel Segment are already achieving or are capable of achieving limitations approaching "stage 2" limitations. Consequently, "stage 1" limitations for each facility would correspond to that level of

achievement, as judged by the permitting authority based on monitoring data supplied by the facility. In this way, EPA would ensure that limitations were derived from the best available technology economically achievable for the segment as a whole, even if that technology varies on a facility-to-facility basis during the interim period before the “stage 2” limitations apply.

EPA acknowledges that the uncertainties in the iron and steel market and the financial circumstances of individual firms may make it difficult to project the economic achievability of particular technologies in future years, even in the comparative near term. The Agency would expect to take into account a variety of factors, including the costs of the BAT model technology over a specified number of years, the expected industry price and revenue cycle, the economic impact of other EPA regulations (if applicable within the time frame) on the Carbon and Alloy Steel Segment of the Integrated and Stand-Alone Hot Forming Subcategory, and resulting aggregate costs, closures, and firm failures.

In the effluent limitations guidelines and standards for the pulp, paper and paperboard industry, EPA adopted an approach similar to BAT Option B as part of its Voluntary Advanced Technology Incentives Program (see 40 CFR 430.24(b)). Facilities choosing to participate in the Voluntary Advanced Technology Incentives Program could enroll at one of three levels, or tiers, each with its own set of limits and time frames for compliance, and each based on a different model BAT technology (with technologies becoming more advanced as the time periods for compliance were extended). For each tier, EPA promulgated voluntary advanced technology BAT limitations that consisted of three separate components. Together, the three components combined to represent BAT for any bleached papergrade kraft and soda mill that elected to participate in the voluntary incentives program. The first component consisted of “stage 1" existing effluent quality limitations that were similar in principle to the “stage 1" limitations described above for BAT Option B (see 40 CFR 430.24(b)(1)). The second component consisted of enforceable interim milestones developed by the permitting authority using best professional judgement to reflect reasonable interim milestones toward achievement of the ultimate BAT limitations (see 40 CFR 430.24(b)(2)). The program also included numeric six-year milestone limitations that would apply to facilities that enrolled in Incentives Tiers with deadlines of 2009 and 2014 (see 40 CFR 430.24(b)(3)). The third component consisted of numeric “stage 2" effluent limitations that reflected the limitations achievable by the model BAT technology for the particular tier. Taken together, these three components constitute reasonable further progress toward the national goal of eliminating the discharge of all pollutants and, for this reason, represent BAT.

The incremental approach of BAT Option B is authorized by CWA section 301(b)(2)(A), which expressly requires BAT to result in reasonable further progress toward the national goal of eliminating pollutant discharges. Although environmental improvements would be realized only incrementally under BAT Option B, each facility would be continuously subject to and required to comply immediately with BAT limitations as they progressively unfold, including each interim BAT limitation or permit condition representing that progress.

EPA's promulgation of BAT Option B as a package of progressively more stringent limitations and conditions is consistent with the use of BAT as a "beacon to show what

is possible." See Kennecott v. EPA, 780 F.2d 445, 448 (4th Cir. 1985). Using BAT Option B, EPA would promulgate forward-looking effluent limitations guidelines and standards for the Carbon and Alloy Steel Segment as a whole. The application of BAT Option B would also promote a form of technological progress that is consistent with Congressional intent that BAT should aspire to "increasingly higher levels of control" (Reference 14-3).

The application of BAT Option B would also be consistent with the overall goals of the CWA (see CWA Section 101(a)). Agencies have considerable discretion to interpret statutes to promote Congressional objectives: "[T]he breadth of agency discretion is, if anything, at zenith when the action . . . relates primarily to . . . the fashioning of policies, remedies and sanctions, including enforcement and voluntary compliance programs[,] in order to arrive at maximum effectuation of Congressional objectives." See U.S. Steelworkers of America v. Marshall, 647 F.2d 1189, 1230-31 n.64 (D.C. Cir. 1980) (upholding OSHA rule staggering lead requirements over 10 years) (quoting Niagara Mohawk Power Corp. v. FPC, 379 F.2d 153, 159 (D.C. Cir. 1967)), cert. denied, 453 U.S. 9113 (1981). The codification of progressively more stringent BAT limitations advances not only the general goal of the CWA, but also advances the explicit goals of the BAT program. See Chevron, U.S.A., Inc. v. NRDC, 467 U.S. 837, 843-44 (1984).

The movement toward elimination of pollutant discharges in stages is also consistent with the overarching structure of the effluent limitations guidelines and standards program. Congress originally envisioned that the sequence of attaining BPT limits in 1977 and BAT limits in 1983 would result in "levels of control which approach and achieve the elimination of the discharge of pollutants" (Reference 14-3). This two-step approach produced dramatic improvements in water quality but did not achieve the elimination of pollutant discharges. Therefore, EPA periodically revisits and revises effluent limitations guidelines and standards with the intention each time of making further progress toward the national goal. The current proposal of the Iron and Steel rule represents the third set of effluent limitations guidelines and standards proposed for the iron and steel industry. Achieving these incremental improvements through successive rulemakings carries a substantial cost: the rulemaking process can be highly complex, in large part because of the massive record compiled to support the Agency's decisions and because of the substantial costs associated with achieving each additional increment of environmental improvement. If EPA were to adopt BAT Option B for the Carbon and Alloy Steel Segment of the Integrated and Stand-Alone Hot Forming Subcategory, the Agency would achieve the goals that Congress envisioned for the BAT program at considerably less cost: one rulemaking that looks both at the present and into the future.

Finally, like other agencies, EPA has inherent authority to phase in regulatory requirements in appropriate cases. EPA has used this authority in other contexts. For example, EPA recently phased in, over two years, Toxic Substances Control Act (TSCA) rules pertaining to lead-based paint activities. See 40 CFR 746.239 and 61 FR 45788, 45803 (Aug. 29, 1996). Similarly, the Occupational Safety and Health Administration phased in, over 10 years, a series of progressively more stringent lead-related controls. See 29 CFR 1910.1025 (1979 ed.). In upholding that rule, the U.S. Court of Appeals for the D.C. Circuit noted that "the extremely remote deadline at which the [sources] are to meet the final [permissible exposure limits] is

perhaps the single most important factor supporting the feasibility of the standard." See United Steelworkers of America v. Marshall, 647 F.2d at 1278.

EPA recognizes that CWA sections 301(b)(2)(C) & (D) require BAT limits to be achieved "in no case later than three years after the date such limits are promulgated under section 304(b), and in no case later than March 31, 1989." (Section 301(b)(2)(F), which refers to BAT limitations for nonconventional pollutants, also contains the March 31, 1989 date but uses as its starting point the date the limitations are "established.") This language does not speak to whether EPA can promulgate BAT limitations that are phased in over time so that a direct discharger at all times is subject to and must comply immediately with particular BAT limitations applicable to them at any given point in time. Because Section 301(b)(2) provides no clear direction, EPA must make a reasonable interpretation of the CWA. See Chevron, U.S.A., Inc. v. NRDC, 467 U.S. at 843-44. The Agency has determined that subjecting facilities to progressively more stringent BAT limitations over time would be the best way of achieving reasonable further progress toward eliminating all pollutant discharges, as intended by Congress. Using BAT Option B, EPA would achieve environmental reductions beyond those that would be achievable if EPA proposed a BAT option based only on what is immediately attainable. The Agency estimates that the total annualized compliance cost for BAT Option B would be $13.3 million, which represents a savings of $7.9 million over BAT Option A.

NSPS--Carbon and Alloy Steel Segment

The treatment technologies that form the basis for NSPS for the Carbon and Alloy Steel Segment of the Integrated and Stand-Alone Hot Forming Subcategory are the same as the BAT-1 model technologies. EPA has determined that BAT Option A is the best demonstrated technology for new sources in the Carbon and Alloy Steel Segment; therefore, the Agency is proposing BAT Option A as the basis for NSPS limitations for the Carbon and Alloy Steel Segment (see previous table for BAT limitations). To ensure that the regulations for new sources represent the most stringent numerical values attainable through the application of the best available control technology for all pollutants, EPA is proposing NSPS limitations for two pollutants not regulated under BAT for the Carbon and Alloy Steel Segment: TSS and O&G. The following table presents these additional limitations.

Integrated and Stand-Alone Hot Forming Subcategory--Carbon and Alloy Steel Segment NSPS Limitations for TSS and O&G

Pollutant	New Source Performance Standards (lbs/ton of product)	
	Maximum Daily	Maximum Monthly Average
Lead	0.000122	0.0000634
Oil and grease (O&G)	0.00793	0.00628
Total suspended solids (TSS)	0.0182	0.0124
Zinc	0.000131	0.0000907

PSES--Carbon and Alloy Steel Segment

EPA is not proposing PSES limitations for the Carbon and Alloy Steel Segment of the Integrated and Stand-Alone Hot Forming Subcategory. EPA evaluated PSES-1 model treatment, which consists of high-rate recycle using a scale pit with oil skimming, roughing clarifier with oil removal, sludge dewatering, a multimedia filter for polishing, and treatment of blowdown with multimedia filtration. Although the application of PSES-1 would reduce current annual wastewater flow by 74 percent and reduce total loadings of priority and nonconventional pollutants by 53 percent, EPA has determined that nationally applicable PSES are unnecessary at this time because the Carbon and Alloy Steel Segment covers only 7 facilities, and the application of PSES-1 would result in an average annual removal of only 21 toxic pound equivalents[3] per facility. The Agency has determined that a case-by-case application of local pretreatment limitations would more appropriately address individual toxic parameters present at these facilities.

PSNS--Carbon and Alloy Steel Segment

EPA is not proposing PSNS limitations for the Carbon and Alloy Steel Segment of the Integrated and Stand-Alone Hot Forming Subcategory for the same reasons the Agency is not proposing PSES limitations for this segment. In addition, EPA does not foresee the construction of any new indirectly discharging facilities that would be covered under this segment. Additionally, EPA has determined that it would not be practicable for a direct discharger covered under the Carbon and Alloy Steel Segment to become an indirect discharger because the flow rates from the facility would be too great for treatment in a POTW.

[3]These removals are much lower than those achieved by other categorical pretreatment standards promulgated by EPA. For example, annual per-facility toxic pound equivalents for the Organic, Chemical, Plastics, and Synthetic Fibers (OCPSF), Electroplating, Battery Manufacturing, and Porcelain Enameling rules range from 6,747 to 14,960. EPA recently chose not to promulgate pretreatment standards for two industrial categories: Industrial Laundries (see 64 FR 45072) and Landfills (see 65 FR 3008) because the industrial laundries standards would remove only 32 and the landfill standards would remove only 14 annual per-facility toxic pound equivalents.

BAT--Stainless Steel Segment

EPA is proposing BAT-1 for the Stainless Steel Segment of the Integrated and Stand-Alone Hot Forming Subcategory. BAT-1 model treatment consists of high-rate recycle using a scale pit with oil skimming, a roughing clarifier with oil removal, sludge dewatering, a multimedia filter for polishing, and treatment of blowdown with multimedia filtration. EPA has determined that this option is economically achievable (Reference 14-2); no facility closures would result from the application of BAT-1.

Integrated and Stand-Alone Hot Forming Subcategory
BAT Limitations for Stainless Steel Segment

Pollutant	BAT Limitations (lbs/ton of product)	
	Maximum Daily	Maximum Monthly Average
Chromium	0.0000808	0.0000362
Nickel	0.000275	0.000144

NSPS--Stainless Steel Segment

The treatment technologies that form the basis for NSPS for the Stainless Steel Segment of the Integrated and Stand-Alone Hot Forming Subcategory are the same as the BAT-1 model technologies; therefore, EPA has set proposed NSPS limitations for the Stainless Steel Segment equal to BAT-1 limitations (see previous table for BAT limitations). To ensure that the regulations for new sources represent the most stringent numerical values attainable through the application of the best available control technology for all pollutants, EPA is proposing NSPS limitations for two pollutants not regulated under BAT for the Stainless Steel Segment: TSS and O&G. The following table presents these additional limitations.

Integrated and Stand-Alone Hot Forming Subcategory--Stainless Steel Segment
NSPS Limitations for TSS and O&G[a]

Pollutant	New Source Performance Standards (lbs/ton of product)	
	Maximum Daily	Maximum Monthly Average
Oil and grease (O&G)	0.0236	0.0119
Total suspended solids (TSS)	0.0265	0.0109

[a]Proposed NSPS limitations for the Stainless Steel Segment of the Integrated and Stand-Alone Hot Forming Subcategory include the BAT limitations presented in the previous table in addition to these limitations for TSS and O&G.

PSES--Stainless Steel Segment

EPA is not proposing PSES limitations for the Stainless Steel Segment of the Integrated and Stand-Alone Hot Forming Subcategory. Although the application of PSES-1 would reduce current annual wastewater flow by 90 percent and reduce total loadings of priority and nonconventional pollutants by 66 percent, EPA has determined that PSES are unnecessary at this time because the Stainless Steel Segment covers only 3 facilities, and the application of PSES-1 would result in an average annual removal of only 4 toxic pound equivalents per facility. These removals are much lower than those achieved by other categorical pretreatment standards promulgated by EPA (see the description of PSES for the Carbon and Alloy Steel Segment of the Integrated and Stand-Alone Hot Forming Subcategory, footnote number 3, for more information). The Agency has determined that a case-by-case application of local pretreatment limitations would more appropriately address individual toxic parameters present at these facilities.

PSNS--Stainless Steel Segment

EPA is not proposing PSNS limitations for the Stainless Steel Segment of the Integrated and Stand-Alone Hot Forming Subcategory for the same reasons the Agency is not proposing PSES limitations for this segment.

14.3.5 Non-Integrated Steelmaking and Hot Forming Subcategory

BAT--Carbon and Alloy Steel Segment

EPA is proposing BAT-1 for the Carbon and Alloy Steel Segment of the Non-Integrated Steelmaking and Hot Forming Subcategory. BAT-1 model treatment consists of solids removal, scale pit with oil skimming (continuous casting and hot forming only), sludge dewatering, a cooling tower, multimedia filtration, high-rate recycle, and treatment of blowdown with multimedia filtration. The application of BAT-1 would reduce current annual wastewater flow by 90 percent and reduce total loadings of priority and nonconventional pollutants by 72 percent. BAT-1 would remove 39,100 toxic pound equivalents per year at an annualized compliance cost of $3.1 million (in 1997 dollars). The Agency has determined that BAT-1 is economically achievable (Reference 14-2); application of this option would cause no facility closures.

The following table presents proposed BAT limitations for the Carbon and Alloy Steel Segment of the Non-Integrated Steelmaking and Hot Forming Subcategory. The Agency proposes zero discharge of process wastewater pollutants to waters of the U.S. as BAT for electric arc furnaces and ladle metallurgy operations (other than vacuum degassing) in the Carbon and Alloy Steel Segment of the Non-Integrated Steelmaking and Hot Forming Subcategory.

Non-Integrated Steelmaking and Hot Forming Subcategory
BAT Limitations for Carbon and Alloy Steel Segment

Pollutant	BAT Limitations (lbs/ton of product)	
	Maximum Daily	Maximum Monthly Average
Vacuum Degassing and Continuous Casting[a]		
Lead	0.0000122	0.00000634
Zinc	0.0000101	0.00000450
Hot Forming		
Lead	0.0000609	0.0000317
Zinc	0.0000506	0.0000225

[a]Limitations are applicable to each vacuum degassing or continuous casting operation on site.

NSPS--Carbon and Alloy Steel Segment

EPA proposes zero discharge of process wastewater pollutants to waters of the U.S. as NSPS for the Carbon and Alloy Steel Segment of the Non-Integrated Steelmaking and Hot Forming Subcategory. NSPS model process wastewater and water pollution control technologies include treatment and high-rate recycle systems, management of process area storm water, and disposal of low-volume blowdown streams by evaporation through controlled application on EAF slag, direct cooling of electrodes in electric arc furnaces, and other evaporative uses.

Operators of 24 existing non-integrated steel facilities have reported zero discharge of process wastewater. These facilities are located in the following states: Alabama, Arizona, Georgia, Illinois, Indiana, Louisiana, New Jersey, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Texas, Utah, and Washington. Under the Non-Integrated Steelmaking and Hot Forming Subcategory, these facilities produce the following carbon, alloy, and stainless steel products: bars, beams, billets, flats, plate, rail, rebar, rod, sheet, slabs, small structurals, strip, and specialty sections.

Consequently, the Agency has determined that zero discharge is well demonstrated and appropriate as NSPS for non-integrated steelmaking and hot forming operations that are located in any area of the United States and manufacture any product. EPA has determined that there is no barrier to entry for new sources to achieve this option; the wastewater treatment technologies and water management practices necessary to achieve zero discharge can be designed and implemented at new facilities.

PSES--Carbon and Alloy Steel Segment

EPA is proposing not to revise PSES limitations for the Carbon and Alloy Steel Segment of the Non-Integrated Steelmaking and Hot Forming Subcategory. As presented in the following table, EPA is recodifying 1982 PSES to fit the revised subcategorization and segmentation of the proposed rule. EPA is reserving PSES for semi-wet EAF steelmaking operations and proposing zero discharge of process wastewater pollutants to POTWs as PSES for ladle metallurgy operations (other than vacuum degassing) within the Carbon and Alloy Steel Segment of the Non-Integrated Steelmaking and Hot Forming Subcategory. For hot forming operations, any existing source that discharges to POTWs must comply with 40 CFR Part 403.

Although the application of PSES-1 would reduce current annual wastewater flow by 7 percent and reduce total loadings of priority and nonconventional pollutants by 4.3 percent, EPA has determined that PSES are unnecessary at this time because the Carbon and Alloy Steel Segment covers only 15 facilities, and the application of PSES-1 would result in an average annual removal of only 3 toxic pound equivalents per facility. These removals are much lower than those achieved by other categorical pretreatment standards promulgated by EPA (see Section 14.3.4, footnote number 3, for more information). The Agency has determined that a case-by-case application of local pretreatment limitations would more appropriately address individual toxic parameters present at these facilities.

Non-Integrated Steelmaking and Hot Forming
PSES for Carbon and Alloy Steel Segment

Pollutant	Pretreatment Standards for Existing Sources (lbs/ton of product)[a]	
	Maximum Daily	Maximum Monthly Average
Vacuum Degassing and Continuous Casting[b]		
Lead	0.0001878	0.0000626
Zinc	0.000282	0.0000938

[a]For hot forming operations, any existing source subject to regulation under the Carbon and Alloy Segment of the Non-Integrated Steelmaking and Hot Forming Subcategory that introduces pollutants into a POTW must comply with 40 CFR Part 403.
[b]Limitations are applicable to each vacuum degassing or continuous casting operation on site.

PSNS--Carbon and Alloy Steel Segment

EPA proposes zero discharge of process wastewater pollutants to waters of the United States and POTWs as both NSPS and PSNS for the Carbon and Alloy Steel Segment of the Non-Integrated Steelmaking and Hot Forming Subcategory. The Agency has determined that there is no barrier to entry for new sources to achieve this option; the wastewater treatment technologies and water management practices necessary to achieve zero discharge can be designed and implemented at new facilities. See the discussion of NSPS for this segment for more information on the Agency's basis for selecting zero discharge.

BAT--Stainless Steel Segment

EPA is proposing BAT-1 for the Stainless Steel Segment of the Non-Integrated Steelmaking and Hot Forming Subcategory. BAT-1 model treatment consists of solids removal, scale pit with oil skimming (continuous casting and hot forming only), sludge dewatering, a cooling tower, multimedia filtration high-rate recycle, and treatment of blowdown with multimedia filtration. The application of BAT-1 would reduce current annual water usage by 50 percent and reduce total loadings of priority and nonconventional pollutants by 29 percent. BAT-1 would remove 1,560 toxic pound equivalents at an annualized compliance cost of $0.1 million (in 1997 dollars). The Agency has determined that BAT-1 is economically achievable (Reference 14-2); application of this option would cause no facility closures.

The following table presents proposed BAT limitations for the Stainless Steel Segment of the Non-Integrated Steelmaking and Hot Forming Subcategory. The Agency proposes zero discharge of process wastewater pollutants to waters of the United States as BAT for EAFs and ladle metallurgy operations (other than vacuum degassing) within the Stainless Steel Segment of the Non-Integrated Steelmaking and Hot Forming Subcategory.

Non-Integrated Steelmaking and Hot Forming Subcategory
BAT/PSES Limitations for Stainless Steel Segment

Pollutant	BAT/PSES Limitations (lbs/ton of product)	
	Maximum Daily	Maximum Monthly Average
Vacuum Degassing and Continuous Casting[a]		
Chromium	0.00000808	0.00000362
Nickel	0.0000275	0.0000144
Hot Forming		
Chromium	0.0000404	0.0000181
Nickel	0.000137	0.0000720

[a]Limitations are applicable to each vacuum degassing or continuous casting operation on site.

NSPS--Stainless Steel Segment

EPA proposes zero discharge of process wastewater pollutants to waters of the United States as NSPS for the Stainless Steel Segment of the Non-Integrated Steelmaking and Hot Forming Subcategory. The Agency has determined that zero discharge is demonstrated and appropriate as NSPS for non-integrated steelmaking and hot forming operations that are located in any area of the United States and manufacture any product. EPA has determined that there is no barrier to entry for new sources to achieve this option; the wastewater treatment technologies and water management practices necessary to achieve zero discharge can be designed and implemented at new facilities. See the description of NSPS for the Carbon and Alloy Steel

Segment of the Non-Integrated Steelmaking and Hot Forming Subcategory for more information on the Agency's basis for selecting zero discharge as NSPS for this subcategory.

PSES--Stainless Steel Segment

The treatment technologies that form the basis for PSES for the Stainless Steel Segment of the Non-Integrated Steelmaking and Hot Forming Subcategory are the same as the BAT-1 model technologies; therefore, EPA has set proposed PSES limitations for the Stainless Steel Segment equal to BAT-1 limitations. Application of this option would reduce current annual wastewater flow by 85 percent and reduce total loadings of priority and nonconventional pollutants by 20 percent. The Agency has determined that this option provides controls for POTW pass-through pollutants and is economically achievable (application of this option would cause no facility closures). As with BAT, the Agency proposes zero discharge of process wastewater pollutants to POTWs as PSES for EAFs and ladle metallurgy operations in the Stainless Steel Segment of the Non-Integrated Steelmaking and Hot Forming Subcategory.

PSNS--Stainless Steel Segment

EPA proposes zero discharge of process wastewater pollutants to waters of the United States and POTWs as both NSPS and PSNS for the Stainless Steel Segment of the Non-Integrated Steelmaking and Hot Forming Subcategory. The Agency has determined that there is no barrier to entry for new sources to achieve this option; the wastewater treatment technologies and water management practices necessary to achieve zero discharge can be designed and implemented at new facilities. See the description of NSPS for the Carbon and Alloy Steel Segment of the Non-Integrated Steelmaking and Hot Forming Subcategory for more information on the Agency's basis for selecting zero discharge as NSPS for this subcategory.

14.3.6 Steel Finishing

BAT--Carbon and Alloy Steel Segment

EPA is proposing BAT-1 for the Carbon and Alloy Steel Segment of the Steel Finishing Subcategory. BAT-1 model treatment consists of recycle of fume scrubber water, countercurrent rinses, a diversion tank, oil removal, hexavalent chrome reduction (where applicable), equalization, chemical precipitation for metals removal, clarification, and sludge dewatering. The application of BAT-1 would reduce current annual wastewater flow by 65 percent and reduce total loadings of priority and nonconventional pollutants by 25 percent. BAT-1 would remove 22,410 toxic pound equivalents per year at an annualized compliance cost of $4.0 million (in 1997 dollars). The Agency has determined that BAT-1 is economically achievable (Reference 14-2); application of this option would cause no facility closures. The following tables present proposed BAT limitations for the Carbon and Alloy Steel Segment of the Steel Finishing Subcategory.

Steel Finishing Subcategory
Maximum Daily BAT Limitations for Carbon and Alloy Steel Segment

Process Operation	BAT Effluent Limitations (lbs/ton of product)[a,b]			
	Maximum Daily			
	Cr^{+6}	Cr	Pb	Zn
(i) Acid pickling--hydrochloric				
(A) Bar, billet, rod, coil	0.0000508	0.000227	0.000596	0.000637
(B) Pipe, tube	0.000106	0.000472	0.00124	0.00133
(C) Plate	0.00000363	0.0000162	0.0000426	0.0000455
(D) Strip, sheet	0.00000518	0.0000231	0.0000609	0.0000650
(ii) Acid pickling--sulfuric				
(A) Bar, billet, rod, coil	0.0000290	0.000130	0.000341	0.000364
(B) Pipe, tube	0.0000518	0.000231	0.000609	0.000650
(C) Plate	0.00000363	0.0000162	0.0000426	0.0000455
(D) Strip, sheet	0.0000238	0.000106	0.000280	0.000299
(iii) Acid regeneration[c]				
(A) Fume scrubbers	0.0149	0.0666	0.175	0.187
(iv) Alkaline cleaning				
(A) Pipe, tube	0.00000207	0.00000925	0.0000243	0.0000260
(B) Strip, sheet	0.0000363	0.000162	0.000426	0.000455
(v) Cold forming				
(A) Direct application-single stand	0.000000311	0.00000139	0.00000365	0.00000390
(B) Direct application-multiple stands	0.0000285	0.000127	0.000335	0.000357
(C) Recirculation-single stand	0.000000104	0.000000463	0.00000122	0.00000130
(D) Recirculation-multiple stands	0.00000259	0.0000116	0.0000304	0.0000325
(E) Combination-multiple stands	0.0000148	0.0000662	0.000174	0.000186
(vi) Continuous annealing lines	0.00000207	0.00000925	0.0000243	0.0000260
(vii) Electroplating				
(A) Plate	0.00000363	0.0000162	0.0000426	0.0000455
(B) Strip, sheet: tin, chromium	0.000114	0.000509	0.00134	0.00143
(C) Strip, sheet: zinc, other metals	0.0000570	0.000255	0.000669	0.000715
(viii) Hot coating				
(A) Galvanizing, terne, and other metals	0.0000570	0.000255	0.000669	0.000715
(ix) Wet air pollution control devices[3]				
(A) Fume scrubbers	0.00224	0.00999	0.0263	0.0281

Cr^{+6} - Hexavalent chromium.
Cr - Chromium.
Pb - Lead.
Zn - Zinc.
[a]Limitations for hexavalent chromium are applicable only when hexavalent chromium is present in untreated wastewater as a result of process or other operations.
[b]Limitations for chromium are applicable only when chromium is present in untreated wastewater as a result of process or other operations.
[c]Limitations are in pounds per day.

Steel Finishing Subcategory
Maximum Monthly Average BAT Limitations for Carbon and Alloy Steel Segment

Process Operation	BAT Effluent Limitations (lbs/ton of product)[a,b]			
	Maximum Monthly Average			
	Cr^{+6}	Cr^{2}	Pb	Zn
(i) Acid pickling--hydrochloric				
(A) Bar, billet, rod, coil	0.0000463	0.000117	0.000311	0.000262
(B) Pipe, tube	0.0000963	0.000243	0.000647	0.000546
(C) Plate	0.00000330	0.00000834	0.0000222	0.0000187
(D) Strip, sheet	0.00000472	0.0000119	0.0000317	0.0000267
(ii) Acid pickling--sulfuric				
(A) Bar, billet, rod, coil	0.0000264	0.0000668	0.000178	0.000150
(B) Pipe, tube	0.0000472	0.000119	0.000317	0.000267
(C) Plate	0.00000330	0.00000834	0.0000222	0.0000187
(D) Strip, sheet	0.0000217	0.0000548	0.000146	0.000123
(iii) Acid regeneration[c]				
(A) Fume scrubbers	0.0136	0.0343	0.0913	0.0770
(iv) Alkaline cleaning				
(A) Pipe, tube	0.00000189	0.00000477	0.0000127	0.0000107
(B) Strip, sheet	0.0000330	0.0000834	0.000222	0.000187
(v) Cold forming				
(A) Direct application-single stand	0.000000283	0.000000715	0.00000190	0.00000160
(B) Direct application-multiple stands	0.0000260	0.0000656	0.000174	0.000147
(C) Recirculation-single stand	0.0000000944	0.000000238	0.000000634	0.00000535
(D) Recirculation-multiple stands	0.00000236	0.00000596	0.0000159	0.0000134
(E) Combination-multiple stands	0.0000135	0.0000341	0.0000907	0.0000765
(vi) Continuous annealing lines	0.00000189	0.00000477	0.0000127	0.0000107
(vii) Electroplating				
(A) Plate	0.00000330	0.00000834	0.0000222	0.0000187
(B) Strip, sheet: tin, chromium	0.000104	0.000262	0.000698	0.000588
(C) Strip, sheet: zinc, other metals	0.0000519	0.000131	0.000349	0.000294
(viii) Hot coating				
(A) Galvanizing, terne, and other metals	0.0000519	0.000131	0.000349	0.000294
(ix) Wet air pollution control devices[c]				
(A) Fume scrubbers	0.00204	0.00515	0.0137	0.0116

Cr^{+6} - Hexavalent chromium.
Cr - Chromium.
Pb - Lead.
Zn - Zinc.
[a]Limitations for hexavalent chromium are applicable only when hexavalent chromium is present in untreated wastewater as a result of process or other operations.
[b]Limitations for chromium are applicable only when chromium is present in untreated wastewater as a result of process or other operations.
[c]Limitations are in pounds per day.

The permit authority may allow for increased mass discharges on a site-specific basis to account for unregulated process wastewater and nonprocess wastewater (e.g., oily wastewater from hot forming mill basements and roll shops, tramp oil from mill oil collection systems, utility wastewater, and groundwater remediation wastewater) if these wastewater streams are co-treated with wastewater regulated under the Steel Finishing Subcategory and generate an increase in effluent volume. Such increased mass discharges are to be calculated as a percentage increase over the otherwise applicable mass discharge based on increased effluent volume.

NSPS--Carbon and Alloy Steel Segment

The treatment technologies that form the basis for NSPS for the Carbon and Alloy Steel Segment of the Steel Finishing Subcategory are the same as the BAT-1 model technologies; therefore, EPA has set proposed NSPS limitations for the Carbon and Alloy Steel Segment equal to BAT-1 limitations (see previous tables for BAT limitations). To ensure that the regulations for new sources represent the most stringent numerical values attainable through the application of the best available control technology for all pollutants, EPA is proposing NSPS limitations for two pollutants not regulated under BAT for the Carbon and Alloy Steel Segment of the Steel Finishing Subcategory: TSS and O&G. The following table presents these additional limitations.

Steel Finishing--Carbon and Alloy Steel Segment
NSPS Limitations for TSS and O&G[a]

Process Operation	New Source Performance Standards (lbs/ton of product)			
	Oil and Grease (O&G)		Total Suspended Solids (TSS)	
	Maximum Daily	Maximum Monthly Average	Maximum Daily	Maximum Monthly Average
(i) Acid pickling--hydrochloric				
(A) Bar, billet, rod, coil	0.0307	0.0274	0.0566	0.0308
(B) Pipe, tube	0.0638	0.0571	0.118	0.0641
(C) Plate	0.00219	0.00196	0.00405	0.00220
(D) Strip, sheet	0.00313	0.00280	0.00578	0.00314
(ii) Acid pickling--sulfuric				
(A) Bar, billet, rod, coil	0.0175	0.0157	0.0324	0.0176
(B) Pipe, tube	0.0313	0.0280	0.0578	0.0314
(C) Plate	0.00219	0.00196	0.00405	0.00220
(D) Strip, sheet	0.0144	0.0129	0.0266	0.0145
(iii) Acid regeneration[b]				
(A) Fume scrubbers	9.01	8.07	16.6	9.05
(iv) Alkaline cleaning				
(A) Pipe, tube	0.00125	0.00112	0.00231	0.00126
(B) Strip, sheet	0.0219	0.0196	0.0405	0.0220

Process Operation	New Source Performance Standards (lbs/ton of product)			
	Oil and Grease (O&G)		Total Suspended Solids (TSS)	
	Maximum Daily	Maximum Monthly Average	Maximum Daily	Maximum Monthly Average
(v) Cold forming				
(A) Direct application-single stand	0.000188	0.000168	0.000347	0.000189
(B) Direct application-multiple stands	0.0172	0.0154	0.0318	0.0173
(C) Recirculation-single stand	0.0000626	0.0000560	0.000116	0.0000628
(D) Recirculation-multiple stands	0.00156	0.00140	0.00289	0.00157
(E) Combination-multiple stands	0.00895	0.00801	0.0165	0.00899
(vi) Continuous annealing lines	0.00125	0.00112	0.00231	0.00126
(vii) Electroplating				
(A) Plate	0.00219	0.00196	0.00405	0.00220
(B) Strip, sheet: tin, chromium	0.0688	0.0616	0.127	0.0691
(C) Strip, sheet: zinc, other metals	0.0344	0.0308	0.0636	0.0346
(viii) Hot coating				
(A) Galvanizing, terne, and other metals	0.0344	0.0308	0.0636	0.0346
(ix) Wet air pollution control devices[b]				
(A) Fume scrubbers	1.35	1.21	2.50	1.36

[a]Proposed NSPS Limitations for the Carbon and Alloy Steel Segment of the Steel Finishing Subcategory include the BAT limitations presented in the previous tables in addition to these limitations for TSS and O&G.
[b]Limitations are in pounds per day.

As with BAT, the permit authority may allow for increased mass discharges on a site-specific basis to account for unregulated process wastewater and nonprocess wastewater if these wastewater streams are co-treated with wastewater regulated under the Steel Finishing Subcategory and generate an increase in effluent volume.

PSES--Carbon and Alloy Steel Segment

EPA is not proposing PSES limitations for the Carbon and Alloy Steel Segment of the Steel Finishing Subcategory. As presented in the following table, EPA is recodifying 1982 PSES to fit the revised subcategorization and segmentation of the proposed rule. Under this proposal, the PSES limitations in the 1982 Iron and Steel rule will continue to apply for all manufacturing processes in this segment except electroplating. PSES limitations for electroplating are currently included in 40 CFR Part 433. Unlike the limitations at 40 CFR Part 420, these limitations are concentration-based. To ensure a consistent basis for facilities conducting electroplating in addition to other steel finishing operations, EPA is proposing to convert the existing concentration-based limitations at Part 433 into mass-based limitations by multiplying the proposed BAT production normalized flow rate and the appropriate conversion factor. Nine pollutants, some of which do not apply to electroplating operations at iron and steel facilities, are regulated under PSES at Part 433. EPA proposes to specify PSES limitations for

four of these pollutants: chromium, lead, nickel, and zinc; these four metals were identified as pollutants of concern for electroplating manufacturing operations in Section 7.

EPA evaluated PSES-1 model treatment for this segment; this model treatment is the same as the model treatment for BAT-1. Although the application of PSES-1 would reduce current annual wastewater flow by 30 percent and reduce total loadings of priority and nonconventional pollutants by 10 percent, EPA has determined that nationally applicable PSES are unnecessary at this time because the application of PSES-1 would result in an average annual removal of only 12 toxic pound equivalents per facility. These removals are much lower than those achieved by other categorical pretreatment standards promulgated by EPA (see Section 14.3.4, footnote number 3, for more information).

Steel Finishing Subcategory
PSES Limitations for Carbon and Alloy Steel Segment

Process Operation	Pollutant	Pretreatment Standards for Existing Sources (lbs/ton of product)[a]	
		Maximum Daily	Maximum Monthly Average
Sulfuric acid pickling (spent acid solutions and rinse water)			
Rod, wire, and coil	Lead	0.001052	0.000350
	Zinc	0.001402	0.000468
Bar, billet, and bloom	Lead	0.000338	0.0001126
	Zinc	0.000450	0.0001502
Strip, sheet, and plate	Lead	0.001052	0.000226
	Zinc	0.001402	0.000300
Pipe, tube, and other products	Lead	0.000384	0.000626
	Zinc	0.00510	0.000834
Hydrochloric acid pickling (spent acid solutions and rinse water)			
Rod, wire, and coil	Lead	0.00184	0.000614
	Zinc	0.00246	0.000818
Strip, sheet, and plate	Lead	0.00384	0.000350
	Zinc	0.00510	0.000468
Pipe, tube, and other products	Lead	0.0000188	0.001276
	Zinc	0.0000126	0.001702
Cold rolling			
Recirculation - single stand	Lead	0.0000188	0.0000062
	Zinc	0.0000126	0.0000042
Recirculation - multiple stands	Lead	0.0000938	0.0000312
	Zinc	0.0000626	0.0000208
Combination	Lead	0.001126	0.000376
	Zinc	0.000752	0.000250
Direct application - single stand	Lead	0.000338	0.0001126
	Zinc	0.000226	0.0000752
Direct application - multiple stands	Lead	0.001502	0.000500
	Zinc	0.001002	0.000334

Process Operation	Pollutant	Pretreatment Standards for Existing Sources (lbs/ton of product)[a]	
		Maximum Daily	**Maximum Monthly Average**
Cold worked pipe and tube mills - using water	Lead	0.0000188	0.0000062
	Zinc	0.0000126	0.0000042
Cold worked pipe and tube mills - using oil solutions	Lead	0.0000188	0.0000062
	Zinc	0.0000126	0.0000042
Electroplating[b]	Chromium	2.77	1.71
	Lead	0.69	0.43
	Nickel	3.98	2.38
	Zinc	2.61	1.48
Hot coating			
Galvanizing, terne coating, and other coatings - strip, sheet, and miscellaneous products	Cr^{+6}	0.000300	0.0001002
	Lead	0.00226	0.000752
	Zinc	0.00300	0.001000
Galvanizing and other coatings - wire products and fasteners	Cr^{+6}	0.001202	0.000400
	Lead	0.00902	0.00300
	Zinc	0.01202	0.00400
Sulfuric acid pickling line fume scrubbers [c,d]	Lead	0.0810	0.0271
	Zinc	0.1080	0.0361
Hydrochloric acid pickling line fume scrubbers [c,d]	Lead	0.0810	0.0271
	Zinc	0.1080	0.0361
Acid regeneration (absorber vent scrubbers) [c,d]	Lead	0.539	0.1802
	Zinc	0.719	0.240
Hot coating line fume scrubbers [2,3]	Cr^{+6}	0.01078	0.003586
	Lead	0.0810	0.0271
	Zinc	0.1080	0.0361

Cr^{+6} - Hexavalent chromium.
[a]The limitations for hexavalent chromium are applicable only to galvanizing operations that discharge wastewater from the chromate rinse step.
[b]Limitations are in milligrams per liter.
[c]Limitations are applicable to each fume scrubber associated with a process operation.
[d]Limitations are in pounds per day.

PSNS--Carbon and Alloy Steel Segment

The treatment technologies that form the basis for PSNS for the Carbon and Alloy Steel Segment of the Steel Finishing Subcategory are the same as the BAT-1 model technologies; therefore, EPA has set proposed PSNS limitations for the Carbon and Alloy Steel Segment equal to BAT-1 limitations (see tables above for BAT limitations).

As with BAT, the permit authority may allow for increased mass discharges on a site-specific basis to account for unregulated process wastewater and nonprocess wastewater if these wastewater streams are co-treated with wastewater regulated under the Steel Finishing Subcategory and generate an increase in effluent volume.

BAT--Stainless Steel Segment

EPA is proposing BAT-1 for the Stainless Steel Segment of the Steel Finishing Subcategory. BAT-1 model treatment consists of recycle of fume scrubber water, countercurrent rinses, acid purification, a diversion tank, oil removal, hexavalent chrome reduction (where applicable), equalization, chemical precipitation for metals removal, clarification, and sludge dewatering. The application of BAT-1 would reduce current annual wastewater flow by 47 percent and reduce total loadings of priority and nonconventional pollutants by 45 percent. BAT-1 would remove 69,700 toxic pound equivalents at an annualized compliance cost of $0.2 million (in 1997 dollars). The Agency has determined that BAT-1 is economically achievable (Reference 14-2); application of this option would cause no facility closures. The following tables present proposed BAT limitations for the Stainless Steel Segment of the Steel Finishing Subcategory.

Steel Finishing Subcategory
Maximum Daily BAT Limitations for Stainless Steel Segment

Process Operation	BAT Limitations (lbs/ton of product)[a,b]				
	Maximum Daily				
	NH_3[c]	Cr^{+6}	Cr	F	Ni
(i) Acid pickling and other descaling					
(A) Bar, billet	0.0437	0.000318	0.000500	0.0446	0.000147
(B) Pipe, tube	0.146	0.00107	0.00167	0.149	0.000494
(C) Plate	0.00665	0.0000484	0.0000760	0.00679	0.0000224
(D) Strip, sheet	0.133	0.000969	0.00152	0.136	0.000449
(ii) Acid regeneration[d]	---			---	
(A) Fume scrubbers		0.199	0.313		0.0923
(iii) Alkaline cleaning	---			---	
(A) Pipe, tube		0.0000277	0.0000434		0.0000128
(B) Strip, sheet		0.00346	0.00543		0.00160
(iv) Cold forming	---			---	
(A) Direct application-single stand		0.0000484	0.0000760		0.0000224
(B) Direct application-multiple stands		0.000381	0.000597		0.000176
(C) Recirculation-single stand		0.00000415	0.00000652		0.00000192
(D) Recirculation-multiple stands		0.0000221	0.0000348		0.0000103
(E) Combination-multiple stands		0.000198	0.000311		0.0000917
(v) Continuous annealing	---			---	
		0.0000277	0.0000434		0.0000128

Process Operation	BAT Limitations (lbs/ton of product)[a,b]				
	Maximum Daily				
	NH_3[c]	Cr^{+6}	Cr	F	Ni
(vi) Wet air pollution control devices[d]					
(A) Fume scrubbers	4.10	0.0299	0.0469	4.19	0.0138

NH_3 - Ammonia nitrogen.
Cr^{+6} - Hexavalent chromium.
Cr - Chromium.
F - Fluoride.
Ni - Nickel.
[a]Limitations for hexavalent chromium are applicable only when hexavalent chromium is present in untreated wastewater as a result of process or other operations.
[b]Limitations for chromium are applicable only when chromium is present in untreated wastewater as a result of process or other operations.
[c]Between proposal and promulgation of the Iron and Steel rule, the Agency plans to further evaluate the regulation of ammonia-N under the Stainless Steel Segment of the Steel Finishing Subcategory.
[d]Limitations are in pounds per day.

Steel Finishing Subcategory
Maximum Monthly Average BAT Limitations for Stainless Steel Segment

Process Operation	BAT Limitations (lbs/ton of product)[a,b]				
	Maximum Monthly Average				
	NH_3[c]	Cr^{+6}	Cr	F	Ni
(i) Acid pickling and other descaling					
(A) Bar, billet	0.0287	0.000196	0.000280	0.0356	0.000104
(B) Pipe, tube	0.0960	0.000655	0.000939	0.119	0.000347
(C) Plate	0.00436	0.0000298	0.0000427	0.00542	0.0000158
(D) Strip, sheet	0.0873	0.000595	0.000854	0.108	0.000315
(ii) Acid regeneration[d]	---			---	
(A) Fume scrubbers		0.122	0.176		0.0649
(iii) Alkaline cleaning	---			---	
(A) Pipe, tube		0.0000170	0.0000244		0.00000901
(B) Strip, sheet		0.00213	0.00305		0.00113
(iv) Cold forming	---			---	
(A) Direct application-single stand		0.0000298	0.0000427		0.0000158
(B) Direct application-multiple stands		0.000234	0.000335		0.000124
(C) Recirculation-single stand		0.00000255	0.00000366		0.00000135
(D) Recirculation-multiple stands		0.0000136	0.0000195		0.00000721
(E) Combination-multiple stands		0.000122	0.000174		0.0000644
(v) Continuous annealing	---	0.0000170	0.0000244	---	0.00000901

Process Operation	BAT Limitations (lbs/ton of product)[a,b]				
	Maximum Monthly Average				
	NH_3[c]	Cr^{+6}	Cr	F	Ni
(vi) Wet air pollution control devices[d]					
(A) Fume scrubbers	2.69	0.0184	0.0263	3.34	0.00973

NH_3 - Ammonia nitrogen.
Cr^{+6} - Hexavalent chromium.
Cr - Chromium.
F - Fluoride.
Ni - Nickel.
[a]Limitations for hexavalent chromium are applicable only when hexavalent chromium is present in untreated wastewater as a result of process or other operations.
[b]Limitations for chromium are applicable only when chromium is present in untreated wastewater as a result of process or other operations.
[c]Between proposal and promulgation of the Iron and Steel rule, the Agency plans to further evaluate the regulation of ammonia-N under the Stainless Steel Segment of the Steel Finishing Subcategory.
[d]Limitations are in pounds per day.

The permit authority may allow for increased mass discharges on a site-specific basis to account for unregulated process wastewater and non-process wastewater (e.g., oily wastewater from hot forming mill basements and roll shops, tramp oil from mill oil collection systems, utility wastewater, and groundwater remediation wastewater) if these wastewater streams are co-treated with wastewater regulated under the Steel Finishing Subcategory and cause an increase in effluent volume. Such increased mass discharges are to be calculated as a percentage increase over the otherwise applicable mass discharge based on increased effluent volume.

NSPS--Stainless Steel Segment

The treatment technologies that form the basis for NSPS for the Stainless Steel Segment of the Steel Finishing Subcategory are the same as the BAT-1 model technologies; therefore, EPA has set proposed NSPS limitations for the Stainless Steel Segment equal to BAT-1 limitations (see previous tables for BAT limitations). To ensure that the regulations for new sources represent the most stringent numerical values attainable through the application of the best available control technology for all pollutants, EPA is proposing NSPS limitations for two pollutants not regulated under BAT for the Stainless Steel Segment of the Steel Finishing Subcategory: TSS and O&G. The following table presents these additional limitations.

Steel Finishing Subcategory--Stainless Steel Segment
NSPS Limitations for TSS and O&G[a]

Process Operation	New Source Performance Standards (lbs/ton of product)			
	Oil and Grease (O&G)		Total Suspended Solids (TSS)	
	Maximum Daily	Maximum Monthly Average	Maximum Daily	Maximum Monthly Average
(i) Acid pickling and other descaling				
(A) Bar, billet	0.0172	0.0136	0.0242	0.0121
(B) Pipe, tube	0.0576	0.0456	0.0809	0.0406
(C) Plate	0.00262	0.00207	0.00368	0.00184
(D) Strip, sheet	0.0523	0.0414	0.0735	0.0369
(ii) Acid regeneration[b]				
(A) Fume scrubbers	10.8	8.52	15.1	7.59
(iii) Alkaline cleaning				
(A) Pipe, tube	0.00149	0.00118	0.00210	0.00105
(B) Strip, sheet	0.187	0.148	0.263	0.132
(iv) Cold forming				
(A) Direct application-single stand	0.00262	0.00207	0.00368	0.00184
(B) Direct application-multiple stands	0.0206	0.0163	0.0289	0.0145
(C) Recirculation-single stand	0.000224	0.000177	0.000315	0.000158
(D) Recirculation-multiple stands	0.00120	0.000947	0.00168	0.000843
(E) Combination-multiple stands	0.0107	0.00846	0.0150	0.00754
(v) Continuous annealing	0.00149	0.00118	0.00210	0.00105
(vi) Wet air pollution control devices[b]				
(A) Fume scrubbers	1.61	1.28	2.27	1.14

[a]Proposed NSPS Limitations for the Stainless Steel Segment of the Steel Finishing Subcategory include the BAT limitations presented in the previous tables in addition to these limitations for TSS and O&G.
[b]Limitations are in pounds per day.

As with BAT, the permit authority may allow for increased mass discharges on a site-specific basis to account for unregulated process wastewater and nonprocess wastewater if these wastewater streams are co-treated with wastewater regulated under the Steel Finishing Subcategory and generate an increase in effluent volume.

PSES--Stainless Steel Segment

EPA is not proposing PSES limitations for the Stainless Steel Segment of the Steel Finishing Subcategory. As presented in the following table, EPA is re-codifying 1982 PSES to fit the revised subcategorization and segmentation of the proposed rule.

EPA evaluated PSES-1 model treatment for the Stainless Steel Segment of the Steel Finishing Subcategory; this model treatment is the same as the model treatment for BAT-1.

The application of PSES-1 would reduce current annual wastewater flow by 23 percent and reduce total loadings of priority and nonconventional pollutants by 10 percent. However, 548 of the 653 total annual toxic pound equivalents that would be removed through PSES-1 are attributable to one parameter--fluoride--from one iron and steel facility. Without considering this parameter, the annual per-facility pollutant removal through PSES-1 drops from 46 to only 7 toxic pound equivalents. This removal is much lower than those achieved by other categorical pretreatment standards promulgated by EPA (see Section 14.3.4, footnote number 3, for more information). Consequently, EPA has determined that it would be more appropriate for the pretreatment control authority for that facility to control pollutant release through its pretreatment control mechanism than for the Agency to implement a national pretreatment standard.

Steel Finishing Subcategory
PSES Limitations for Stainless Steel Segment

Process Operation	Pollutant	Pretreatment Standards for Existing Sources (lbs/ton of product)	
		Maximum Daily	Maximum Monthly Average
Salt bath descaling - oxidizing			
Batch - sheet and plate	Chromium	0.00584	0.00234
	Nickel	0.00526	0.001752
Batch - rod and wire	Chromium	0.00350	0.001402
	Nickel	0.00316	0.001052
Batch - pipe and tube	Chromium	0.01418	0.00568
	Nickel	0.01276	0.00426
Continuous	Chromium	0.00276	0.001102
	Nickel	0.00248	0.000826
Salt bath descaling - reducing			
Batch	Chromium	0.00204	0.000678
	Nickel	0.00244	0.000814
Continuous	Chromium	0.01138	0.0038
	Nickel	0.01366	0.00456

Process Operation	Pollutant	Pretreatment Standards for Existing Sources (lbs/ton of product)	
		Maximum Daily	**Maximum Monthly Average**
Combination acid pickling (spent acid solutions and rinse water)			
Rod, wire, and coil	Chromium	0.00426	0.001704
	Nickel	0.00384	0.001276
Bar, billet, and bloom	Chromium	0.001920	0.000768
	Nickel	0.001728	0.000576
Strip, sheet, and plate - continuous	Chromium	0.01252	0.00500
	Nickel	0.01126	0.00376
Strip, sheet, and plate - batch	Chromium	0.00384	0.001536
	Nickel	0.00346	0.001152
Pipe, tube, and other products	Chromium	0.00644	0.00258
	Nickel	0.00578	0.001928
Cold rolling			
Recirculation - single stand	Chromium	0.0000418	0.00000168
	Nickel	0.0000376	0.0000126
Recirculation - multiple stands	Chromium	0.000208	0.0000836
	Nickel	0.0001878	0.0000626
Combination	Chromium	0.00250	0.001002
	Nickel	0.00226	0.000752
Direct application - single stand	Chromium	0.000752	0.000300
	Nickel	0.000676	0.000226
Direct application - multiple stands	Chromium	0.00334	0.001336
	Nickel	0.0030	0.001002
Cold worked pipe and tube mills - using water	Chromium	0.0000418	0.0000168
	Nickel	0.0000376	0.0000126
Cold worked pipe and tube mills - using oil solutions	Chromium	0.0000418	0.0000168
	Nickel	0.0000376	0.0000126
Fume scrubber [a,b]	Chromium	0.1802	0.0719
	Nickel	0.1617	0.0539

[1]Limitations are applicable to each fume scrubber associated with a process operation.
[2]Limitations are in pounds per day.

PSNS--Stainless Steel Segment

The treatment technologies that form the basis for PSNS for the Stainless Steel Segment of the Steel Finishing Subcategory are the same as the BAT-1 model technologies; therefore, EPA has set proposed PSNS limitations for the Stainless Steel Segment of the Steel Finishing Subcategory equal to BAT-1 limitations (see tables above for BAT limitations). As with BAT, the permit authority may allow for increased mass discharges on a site-specific basis to account for unregulated process wastewater and nonprocess wastewater if these wastewater streams are co-treated with wastewater regulated under the Steel Finishing Subcategory and generate an increase in effluent volume.

14.3.7 Other Operations

BAT--Direct Reduced Ironmaking Segment

EPA is reserving BAT limitations for the Direct Reduced Ironmaking Segment of the Other Operations Subcategory because the Agency has identified no priority or nonconventional pollutants of concern for this segment.

NSPS--Direct Reduced Ironmaking Segment

The treatment technologies that form the basis for NSPS for the Direct Reduced Ironmaking Segment of the Other Operations Subcategory are the same as the BPT-1 model treatment technologies for this segment, which consist of solids removal, sludge dewatering, a cooling tower, high-rate recycle, and treatment of blowdown with multimedia filtration. The following table presents the proposed NSPS limitations.

Other Operations Subcategory
NSPS Limitations for Direct Reduced Ironmaking Segment

	New Source Performance Standards (lbs/ton of product)	
Pollutant	**Maximum Daily**	**Maximum Monthly Average**
Total suspended solids (TSS)	0.0200	0.00929

PSES--Direct Reduced Ironmaking Segment

EPA is reserving PSES limitations for the Direct Reduced Ironmaking Segment of the Other Operations Subcategory because the Agency has identified no POTW pass-through pollutants for this segment.

PSNS--Direct Reduced Ironmaking Segment

EPA is reserving PSNS limitations for the Direct Reduced Ironmaking Segment of the Other Operations Subcategory because the Agency has identified no POTW pass-through pollutants for this segment.

BAT--Forging Segment

EPA is reserving BAT limitations for the Forging Segment of the Other Operations Subcategory because the Agency has identified no priority or nonconventional pollutants of concern for this segment.

NSPS--Forging Segment

The treatment technologies that form the basis for NSPS for the Forging Segment of the Other Operations Subcategory are the same as the BPT-1 model treatment technologies for this segment, which are based on high rate recycle and oil/water separation. The following table presents the proposed NSPS limitations.

Other Operations Subcategory
NSPS Limitations for Forging Segment

Pollutant	New Source Performance Standards (lbs/ton of product)	
	Maximum Daily	Maximum Monthly Average
Oil and grease (O&G)	0.0149	0.00889
Total suspended solids (TSS)	0.0235	0.0118

PSES--Forging Segment

EPA is reserving PSES limitations for the Forging Segment of the Other Operations Subcategory because the Agency has identified no POTW pass-through pollutants for this segment.

PSNS--Forging Segment

EPA is reserving PSNS limitations for the Forging Segment of the Other Operations Subcategory because the Agency has identified no POTW pass-through pollutants for this segment.

BAT/NSPS/PSES/PSNS--Briquetting Segment

EPA proposes zero discharge of process wastewater pollutants to waters of the U.S. and POTWs as BAT, NSPS, PSES, and PSNS for the Briquetting Segment of the Other Operations Subcategory.

14.4 References

14-1. U.S. Environmental Protection Agency. Development Document for Effluent Guidelines and Standards for the Iron and Steel Manufacturing Point Source Category. EPA/440/1-82/024. Washington, D.C., May 1982, Volume I, Table I-1, pp. 13 to 17.

14-2. U.S. Environmental Protection Agency. Economic Analysis of the Proposed Effluent Limitations Guidelines and Standards for the Iron and Steel Manufacturing Point Source Category. EPA 821-B-00-009. Washington, D.C., December 2000.

14-3. Statement of Senator Muskie (Oct. 4, 1972), reprinted in A Legislative History of the Water Pollution Control Act Amendments of 1972 ("1972 Leg. Hist."), 170.

Table 14-1

Limitations for Best Practicable Control Technology Currently Available (BPT) Under 1982 Rule

Subcategory	Process Wastewater Source	Pollutant	Maximum daily[a]	Maximum Monthly Average[a]
Cokemaking	By-product cokemaking (iron and steel coke plants)[b]	O&G TSS	0.0654 0.506	0.0218 0.262
	By-product cokemaking (Merchant coke plants)[c]	O&G TSS	0.0698 0.540	0.0232 0.280
	Non-recovery cokemaking	[d]	[d]	[d]
Ironmaking	Sintering operations (with wet air pollution controls)	O&G TSS	0.0300 0.150	0.0100 0.050
	Blast furnaces	O&G TSS	--- 0.156	---- 0.0520
	Sintering operations (with dry air pollution controls)	[d]	[d]	[d]
Integrated Steelmaking	Basic oxygen furnaces (1) Semi-wet air pollution control[e]	O&G TSS	--- ---	--- ---
	(2) Wet-open combustion	O&G TSS	--- 0.137	--- 0.0458
	(3) Wet-suppressed combustion	O&G TSS	--- 0.0624	--- 0.0208
	Vacuum degassing	O&G TSS	--- 0.0312	--- 0.0104
	Continuous casting	O&G TSS	0.0468 0.156	0.0156 0.052
	Ladle metallurgy	(d)	(d)	(d)

Table 14-1 (Continued)

Subcategory	Process Wastewater Source	Pollutant	Maximum daily[a]	Maximum Monthly Average[a]
Integrated and Stand-Alone Hot Forming	Primary mills, carbon and specialty (1) Without scarfing	O&G TSS	0.0748 0.300	--- 0.112
	(2) With scarfing	O&G TSS	0.442 0.111	--- 0.166
	Section mills, carbon and specialty (1) Carbon	O&G TSS	0.179 0.714	--- 0.268
	(2) Specialty	O&G TSS	0.112 0.448	--- 0.128
	Flat mills (1) Hot strip and sheet, carbon and specialty	O&G TSS	0.214 0.854	--- 0.320
	Plate mills (1) Carbon	O&G TSS	0.114 0.454	--- 0.170
	(2) Specialty	O&G TSS	0.0500 0.200	--- 0.0752
	Pipe and tube mills, carbon and specialty	O&G TSS	0.106 0.424	--- 0.159
Nonintegrated Steelmaking and Hot Forming	Electric arc furnaces	(e)	(e)	(e)
	Vacuum degassing	O&G TSS	--- 0.0312	--- 0.0104
	Continuous casting	O&G TSS	0.0468 0.156	0.0156 0.052
	Hot forming mills	O&G TSS	0.0748 0.300	--- 0.112
	Ladle metallurgy	(d)	(d)	(d)

Table 14-1 (Continued)

Subcategory	Process Wastewater Source	Pollutant	Maximum daily[a]	Maximum Monthly Average[a]
Steel Finishing	Salt bath descaling-oxidizing			
	(1) Batch, sheet and plate	O&G TSS	NA 0.408	NA 0.175
	(2) Batch, rod	O&G TSS	NA 0.246	NA 0.105
	(3) Batch, pipe and tubes	O&G TSS	NA 0.992	NA 0.426
	(4) Continuous	O&G TSS	NA 0.193	NA 0.0826
	Salt bath descaling-reducing			
	(1) Batch	O&G TSS	NA 0.190	NA 0.0814
	(2) Continuous	O&G TSS	NA 1.06	NA 0.456
	Acid pickling-sulfuric			
	(1) Rod, coil	O&G TSS	0.0700 0.164	0.0234 0.070
	(2) Bar, billet, bloom	O&G TSS	0.0226 0.0526	0.00750 0.0226
	(3) Strip, sheet and plate	O&G TSS	0.0450 0.105	0.0150 0.045
	(4) Pipe, tubes and other products	O&G TSS	0.125 0.292	0.0418 0.125
	Acid pickling-hydrochloric			
	(1) Rod, coil	O&G TSS	0.123 0.286	0.0408 0.123
	(2) Strip, sheet and plate	O&G TSS	0.0700 0.164	0.0234 0.070
	(3) Pipe, tubes and other products	O&G TSS	0.256 0.596	0.0852 0.256

Table 14-1 (Continued)

Subcategory	Process Wastewater Source	Pollutant	Maximum daily[a]	Maximum Monthly Average[a]
Steel Finishing (cont.)	Acid pickling-combination			
	(1) Rod, coil	O&G TSS	0.128 0.298	0.0426 0.128
	(2) Bar, billet, bloom	O&G TSS	0.0576 0.134	0.0192 0.0576
	(3) Strip, sheet and plate-continuous	O&G TSS	0.376 0.876	0.125 0.376
	(4) Strip, sheet and plate-batch	O&G TSS	0.115 0.268	0.0384 0.115
	(5) Pipe, tubes and other products	O&G TSS	0.193 0.450	0.0644 0.193
	Cold rolling mills			
	(1) Recirculation-single stand	O&G TSS	0.00104 0.0025	0.000418 0.00125
	(2) Recirculation-multiple stands	O&G TSS	0.0522 0.0125	0.00208 0.00626
	(3) Combination	O&G TSS	0.0626 0.150	0.0250 0.0752
	(4) Direct application-single stand	O&G TSS	0.0188 0.045	0.00752 0.0226
	(5) Direct application-multiple stands	O&G TSS	0.0834 0.200	0.0334 0.100
	Alkaline cleaning			
	(1) Batch	O&G TSS	0.0626 0.146	0.0208 0.0626
	(2) Continuous	O&G TSS	0.0876 0.204	0.0292 0.0876
	Hot coating: galvanizing, terne, other metals			
	(1) Strip, sheet and miscellaneous products	O&G TSS	0.150 0.350	0.0500 0.150
	Electroplating	O&G TSS	52[f] 60[f]	26[f] 31[f]

Table 14-1 (Continued)

Subcategory	Process Wastewater Source	Pollutant	Maximum daily[a]	Maximum Monthly Average[a]
Steel Finishing (cont.)	Fume scrubbers: acid pickling, alkaline cleaning, hot coating, other	O&G TSS	5.39[g] 12.58[g]	1.76[g] 5.39[g]
	Absorber vent scrubber: hydrochloric acid regeneration	O&G TSS	35.86[g] 84.04[g]	11.99[g] 35.86[g]

Sources: 40 CFR Part 420 and Part 433.
O&G - Oil and grease.
TSS - Total suspended solids.
NA - Not applicable.

[a]Pounds per ton of product.
[b]For iron and steel coke plants, increased loadings, not to exceed 11 percent of the above limitations, shall be provided for process wastewaters from wet desulfurization systems, but only to the extent such systems generate process wastewaters.
[c]For merchant coke plants, increased loadings, not to exceed 10 per cent of the above limitations, shall be provided for process wastewaters from wet desulfurization systems, but only to the extent such systems generate process wastewaters.
[d]For these segments, except as provided in 40 CFR 125.30 through 125.32, any existing point source must have no discharge of process wastewater pollutants to waters of the United States.
[e]1982 regulation allowed for no discharge of process wastewater from this operation.
[f]Limitations transferred from 40 CFR Part 433 and expressed in milligrams per liter.
[g]Values are expressed in pounds per day for this operation.

SECTION 15

IMPLEMENTATION OF PART 420 THROUGH THE NPDES AND PRETREATMENT PROGRAMS

Sections 301, 304, 306 and 307 of the Clean Water Act (CWA) provide that EPA must promulgate national effluent limitations guidelines and standards of performance for major industrial categories for three classes of pollutants:

- Conventional pollutants, which include total suspended solids (TSS), oil and grease (O&G), biochemical oxygen demand (BOD_5), fecal coliform, and pH;

- Designated priority pollutants (e.g., toxic metals such as chromium, lead, nickel, and zinc; toxic organic constituents such as benzene, benzo-*a*-pyrene, and naphthalene); and

- Nonconventional pollutants, which are designated as neither conventional nor priority pollutants (e.g., ammonia as nitrogen, thiocyanate, fluoride, iron, and 2,3,7,8-tetrachlorodibenzofuran (TCDF)).

40 CFR Part 420, as well as other categorical effluent regulations promulgated by EPA, contains six types of effluent limitations guidelines and standards:

- Best Practicable Control Technology Currently Available (BPT);
- Best Control Technology for Conventional Pollutants (BCT);
- Best Available Technology Economically Achievable (BAT);
- New Source Performance Standards (NSPS);
- Pretreatment Standards for Existing Sources (PSES); and
- Pretreatment Standards for New Sources (PSNS).

BPT, BCT, BAT, and NSPS limitations regulate only those sources that discharge effluent directly into waters of the United States. PSES and PSNS limitations restrict pollutant discharges for those sources that discharge indirectly through sewers flowing to publicly owned treatment works (POTWs).

15.1 NPDES Permit Program

Section 402 of the CWA establishes the National Pollutant Discharge Elimination System (NPDES) permit program. The NPDES permit program is designed to limit the discharge of pollutants into navigable waters of the United States through a combination of various requirements, including technology-based and water-quality-based effluent limitations. The proposed Iron and Steel regulation contains the categorical technology-based effluent limitations guidelines and standards applicable to the iron and steel industry to be used by permit writers to

derive NPDES permit technology-based effluent limitations. Water-quality-based effluent limitations (WQBELs) are based on receiving water characteristics, designated water uses, and ambient water quality standards. WQBELs are derived independently from the technology-based effluent limitations set out in Part 420. The CWA requires NPDES permits to contain the more stringent of the technology-based and the water-quality-based effluent limitations applicable to a given discharge.

Section 402(a)(1) of the CWA provides that, in the absence of promulgated effluent limitations guidelines or standards, the Administrator or the Administrator's designee, including designated state permit authorities, may establish effluent limitations for specific dischargers on a case-by-case basis. Federal NPDES permit regulations provide that these limits may be established using "best professional judgement" (BPJ), taking into account any proposed effluent limitations guidelines and standards and other relevant scientific, technical, and economic information. Where EPA has promulgated technology-based effluent limitations guidelines and standards, any more stringent effluent limitations must be either WQBELs or technology-based effluent limitations derived under regulations established independently by the permit authority.

Section 301 of the CWA, as amended by the Water Quality Act of 1987, required that BPT effluent limitations were to be achieved by July 1, 1977. BAT effluent limitations for priority and nonconventional pollutants and BCT effluent limitations for conventional pollutants were to be achieved as expeditiously as possible, but not later than three years from date of promulgation, and in no case later than March 31, 1989 (see §125.3). Because EPA will promulgate revisions to Part 420 after March 31, 1989 (after the statutory BAT compliance date for priority pollutants), effluent limitations based on the revised effluent limitations guidelines must be included in the next NPDES permits issued after promulgation of the regulation with no compliance schedule.

The NPDES permit program defines *major dischargers* as those that, by nature of their size and operations, can have a significant impact on human health or the environment. EPA classified most direct dischargers in the iron and steel industry as major dischargers because they are relatively large industrial complexes that have caused or have the potential to cause adverse water quality impacts. NPDES permits for major dischargers are issued and renewed according to the federal NPDES regulations as well as regulations enacted by permit authorities to maximize opportunity for public review and comment. Chapter 11 of the U.S. EPA NPDES Permit Writer's Manual (Reference 15-1) discusses the administrative process for drafting and issuing NPDES permits, including preparation of the draft permit and fact sheet, construction of the administrative record, notification of the public, consideration of public comments, and issuance of the final permit. The NPDES permit fact sheet or statement of basis sets out the regulatory and technical bases for the terms and conditions in the permit.

The NPDES permit regulations allow modification of permit effluent limitations derived from the effluent limitations guidelines through the following specific variances and other procedures:

- Section 301(c), economic variance from BAT;
- Section 301(g), water-quality-related variance from BAT for nonconventional pollutants;
- Section 316(a), thermal variance from BPT, BCT, and BAT;
- Fundamentally different factors variance (40 CFR Part 125, Subpart D); and
- Net credits (40 CFR Part 122.45(g)).

Although EPA has not promulgated final regulations that establish criteria for applying for and evaluating applications for Section 301(c) and 301(g) variances, the Agency has published guidance materials for permit authorities regarding such variances. Variances under Section 316(a) for thermal discharges are not at issue in the 1982 regulation or the proposed regulation because EPA has not promulgated or proposed effluent limitations guidelines and standards for thermal discharges. See the sections below, the guidance materials, and 40 CFR Part 125 for further information regarding the above-listed variances.

The NPDES permit regulations at 40 CFR Part 125, Subpart K, establish criteria and standards for Best Management Practices (BMPs), which are authorized under Section 304(e) of the CWA. BMPs may be included in effluent limitations guidelines and standards or established on a case-by-case basis by permit authorities in individual NPDES permits. BMPs are designed typically to control discharges of pollutants from activities that are ancillary to the manufacturing operations regulated by the numerical effluent limitations guidelines and standards (e.g., EPA is not proposing BMPs, but provides in this section examples of BMPs that permit writers can include in NPDES permits under appropriate circumstances.

15.2 National Pretreatment Standards

40 CFR Part 403 sets out national pretreatment standards that have three principal objectives:

- To prevent the introduction of pollutants that will interfere with POTW operations, including the use or disposal of municipal sludge;
- To prevent the introduction of pollutants that will pass through POTWs or otherwise be incompatible with POTWs; and
- To improve opportunities to recycle and reclaim municipal and industrial wastewater and sludge.

The national pretreatment standards prohibit certain discharges that interfere with POTW operations, and include federal categorical pretreatment standards designed to prevent pass-through of pollutants introduced into POTWs by industrial sources. Part 420 sets out the federal categorical pretreatment standards applicable to the iron and steel industry. Local control authorities are required to implement the national pretreatment program, which includes applying federal categorical pretreatment standards to industrial users that are subject to those standards and any local pretreatment standards that may be more restrictive than the federal categorical standards. The proposed regulation revises the federal categorical pretreatment standards applicable to iron and steel facilities regulated by Part 420. Facilities must meet effluent limitations based on the federal categorical pretreatment standards not later than three years after promulgation of the standards.

15.3 NPDES Permit and Pretreatment Production Rates

The effluent limitations guidelines and standards for BPT, BAT, NSPS, PSES, and PSNS in the proposed regulation are expressed as mass limitations in pounds/ton of product. Each mass limitation is calculated by multiplying an effluent concentration (determined from the analysis of treatment system performance) by a model flow rate appropriate for each subcategory, expressed in gallons/ton of product or gallons/day. The production-normalized flow rates used to develop many of the limitations in the proposed rule are considerably lower than those used to develop limitations in the 1982 rule. Consequently, many of the proposed limitations are more stringent than the 1982 limitations for the same operations, even though other components of the technology options remain the same. The proposed limitations do not require facilities to install any specific control technology or achieve any specific flow rate or effluent concentration; facilities can use various treatment alternatives or water conservation practices to meet the limitations or standards. Each model treatment system described in Section 8 illustrates at least one means available to achieve the proposed effluent limitations guidelines and standards.

The NPDES regulations at §122.45(f) require that NPDES permit effluent limitations be specified as mass effluent limitations (e.g., pounds/day or kilograms/day), except under certain circumstances that do not apply to the proposed rule. To convert the proposed effluent limitations (pounds/ton) to a monthly average or daily maximum permit limit, the permitting authority would use a production rate with units of tons/day. The 1982 iron and steel rule and Part 122.45(b)(2) of the NPDES permit regulations require that NPDES permit and pretreatment limits be based on a "...reasonable measure of actual production." NPDES permits for this industry have commonly used either the highest annual average production over the prior five years prorated to a daily basis or the highest monthly production over the prior five years prorated to a daily basis. Industry stakeholders have requested that: (1) EPA should specify the method used to determine appropriate production rates for calculating allowable mass loadings, so all permit writers use the same basis; and (2) EPA should use a high production basis, such as the maximum monthly production over the prior five years or the maximum design production, to ensure that facilities will not be out of compliance during periods of high production.

The NPDES permit regulations at 40 CFR 122.45(b)(2)(I) require that mass effluent limitations calculated for existing sources from production-based effluent limitations guidelines and standards must be based not on production capacity but on a "reasonable measure of actual production." The 1982 iron and steel regulation at 40 CFR 420.04 sets out the basis for calculating mass-based pretreatment requirements and also dictates that pretreatment requirements must be based on a reasonable measure of actual production. The 1982 regulation provides the following examples of what may constitute a reasonable measure of actual production: the monthly average for the highest of the previous five years or the high month of the previous year. Both values are converted to a daily basis (i.e., tons/day) to calculate monthly average and daily maximum mass permit effluent limitations. The national pretreatment regulations at 40 CFR 403.6(c)(3) have similar provisions for deriving mass-based pretreatment requirements.

The above regulations require that effluent limitations guidelines and pretreatment standards for new sources be based on projected production. EPA is proposing that approach in the proposed iron and steel regulation.

EPA believes that some NPDES and pretreatment permit production rates have not been calculated using a "reasonable measure of actual production." In some cases, maximum production rates for similar process units discharging to one treatment system have been determined from different years or months. In EPA's view, this approach may provide an unrealistically high measure of actual production if the different process units could not reasonably produce at these high rates simultaneously.

Ideally, permit writers would apply production-based effluent limitations guidelines and standards using relatively constant production from day to day or month to month. In this situation, the production rate used to calculate the permit limitations would then be the average rate. However, production rates in the iron and steel industry vary significantly over time (especially over a 5-year permit period), based on factors such as fluctuations in market demand for domestic products, maintenance, product changes, equipment failures, and facility modifications.

To determine a production estimate for a mill, permit writers should develop a reasonable measure of production for the facility during the next term of the permit. The permit writer uses this production estimate along with the production-based limitations to establish a maximum mass of pollutant that the facility may discharge each day and month. However, if the permit production rate is based on the maximum month, the permit could allow excessive pollutant discharges during the permit period. As a result, facilities may not have an incentive to implement optimal waste management, water conservation, and wastewater treatment practices during lower production periods. On the other hand, if the permit production rate is based on an average of the highest year of production over the prior five years, facilities may have trouble ensuring that their waste management, water conservation, and wastewater treatment practices can accommodate shorter periods of higher production. This situation might require facilities to meet, during these periods of high production, a more stringent treatment level than that on which

the limits were based. To do this, facilities would likely have to develop more efficient treatment systems, greater hydraulic surge capacity, and better water conservation and waste management practices.

15.3.1 Alternatives for Establishing Permit Effluent Limitations

EPA has solicited comment on several alternative approaches to establishing permit limits; these approaches may result in more stringent mass-based permit limits for some facilities (with better protection of the environment over the life of a permit) and may result in higher costs. Each approach excludes production from unit operations that do not generate or discharge process wastewater.

Alternative A

The approach under Alternative A is the basis for the proposed iron and steel effluent limitations. This approach retains the essential requirements of the 1982 rule as described above (see §420.3). However, the proposed rule provides additional instructions for avoiding approaches that result in unrealistically high estimates of actual production by considering only the production from all production units that could operate simultaneously (see §420.3(c)). Alternative A may result in higher costs for those facilities whose permits are based on production levels that are higher than those that could occur simultaneously at multiple process units. However, EPA included these costs in the economic analysis for the 1982 regulation as well as the proposed rule.

Alternative B

Under Alternative B, the Agency is considering requiring the permit writer to establish multitiered permit limits. Permit writers and control authorities currently use BPJ to establish multitiered permit limits. The Agency has issued guidance for use in considering multitiered permits (see Chapter 5 of the U.S. EPA NPDES Permit Writer's Manual and Chapter 7 of the Industrial User Permitting Guidance Manual (References 15-1 and 15-2)).

In situations where a single set of effluent limitations is not appropriate for the entire period of a permit, permit writers may establish a tiered permit. One set of limits would apply for periods of average production, and other sets of limits would apply when the average production rate significantly changes. EPA believes that a 10 to 15 percent deviation above or below the long-term average production rate falls within the range of normal variability. For facilities that have predictable changes in long-term production that fall outside of this range, permit writers should consider establishing a tiered or multitiered permit. The iron and steel industry has a variable historical production rate, and the permit modification process is not fast enough to respond to the need for higher or lower equivalent limits. For example, many iron and steel mills have a characteristic historical average monthly production rate that varies between 60 and 95 percent of plant capacity (note that for a mill operating at 60 percent of capacity, a production increase to 95 percent of capacity would represent a nearly 60 percent increase in

production). In this example, permit writers may establish alternate effluent limitations for average production rates at 75 and 95 percent of capacity.

Alternative C

Under Alternative C, EPA is considering revising the definition of production to provide a basis for deriving NPDES and pretreatment permit production rates that are "reasonable measures of actual production" and that can be applied consistently for iron and steel facilities subject to Part 420. The modified definition of the NPDES and pretreatment permit production basis would be the average daily operating rate for the year with the highest annual production over the prior five years, taking into account the annual hours of operation of the production unit and the typical operating schedule of the production unit, as illustrated by the following example.

Highest annual production from prior five years	3,570,000	tons
Operating hours	8,400	hours
Hourly operating rate	425	tons/hour
Average daily operating rate (24 hour day)	10,200	tons/day

The above example is for a process unit that is typically operated 24 hours per day with short-term outages for maintenance on a weekly or monthly basis. For steel processing facilities that operate typically less than 24 hours per day, the average daily operating rate must be based on the typical operating schedule (e.g., 8 hours per day for a facility operating one 8-hour turn (or shift) per day; 16 hours per day for a facility operating two 8-hour turns per day), as shown below.

Highest annual production from prior five years	980,000	tons
Operating hours	4,160	hours
Hourly operating rate	235.6	tons/hour
Average daily operating rate (16-hour day)	3,769	tons/day

EPA recognizes that the approach in the above example could cause problems for a facility that operated 16 hours/day at the time the permit was issued and then changed to a 24-hour/day schedule based on unforseen changes in market conditions. To address these potential problems, facilities could combine this approach with the tiered permit approach under Alternative B.

For multiple similar process units discharging to the same wastewater treatment system with one NPDES or pretreatment permit compliance point (e.g., two blast furnaces operated with one treatment and recycle system for process wastewater), the permit writer would base the year with the highest annual production over the prior five years on the sum of annual

production for both furnaces. Then, as above, the permit writer would calculate the average daily operating rate for each furnace independently using the annual production for that year and the annual operating hours for each furnace. The average daily operating rate for the combination of the two furnaces would be the sum of the daily production values. For example, consider the following production data.

Year	Furnace A	Furnace B	Total (tons)
1995	1,850,000	1,305,000	3,155,000
1996	1,675,000	1,425,000	3,100,000
1997	1,760,000	1,406,000	3,166,000
1998	1,580,000	1,328,000	2,908,000
1999	1,825,000	1,380,000	3,205,000

Annual maximum production rates for each furnace and the total for both furnaces are underlined. In this example, 1999 was the maximum production year for the combination of the furnaces, and the data from each furnace for that year would be used to calculate the average daily operating rates. Combining the 1995 data from Furnace A and the 1996 data from Furnace B (3,275,000 tons), might have produced an unrealistic measure of actual production if the two furnaces could not produce at these high levels concurrently (e.g., if the downstream intermediate production capacity effectively limits the combined production of the two furnaces). On the other hand, if the two furnaces could expect to produce at these high levels concurrently over the next five-year permit period if strong market conditions prevailed, then the production based on the combined 1995 Furnace A data and the 1996 Furnace B data might not be unrealistic.

In contrast to the previous example, for multiple process units that are not similar but have process wastewater discharges that are co-treated in one centralized wastewater treatment system with one NPDES or pretreatment permit compliance point, the year with the highest production over the prior five years would be determined separately for each production unit or combination of similar production units with the highest annual production. The following table lists production data for a facility that discharges process wastewater streams for basic oxygen furnace (BOF) steelmaking, vacuum degassing, and continuous casting operations through one NPDES or pretreatment permit compliance point.

Year	BOF (tons)	Vacuum Degasser (tons)	Continuous Caster (tons)
1995	2,675,000	1,305,000	2,658,000
1996	2,900,000	1,600,000	2,885,000
1997	3,150,000	1,690,000	3,140,000
1998	3,280,000	1,668,000	3,270,000
1999	3,225,000	1,380,000	3,215,000

In this example, the permit writer would use 1998 production data for the BOF, 1997 data for the vacuum degasser, and 1998 data for the continuous caster to develop the permit limitations. An analogous situation would occur in a steel finishing plant with acid pickling, cold rolling, and electroplating operations with wastewater discharges that are co-treated in one centralized wastewater treatment system with one permit compliance point.

If EPA adopted the approach under Alternative C, the Agency would also add to the proposed regulation (§420.7) a requirement that facilities provide documentation of NPDES permit production rates with their NPDES permit renewal applications.

Alternative D

Under Alternative D, the Agency is considering establishing production-based maximum monthly average effluent limitations and standards in combination with daily maximum concentration-based effluent limitations and standards. Under this approach, permit writers would determine the maximum monthly average NPDES and pretreatment permit mass basis requirements using the Part 420 production-based standards in combination with a reasonable measure of actual production, such as that discussed under Alternative C. However, the daily maximum requirements included in Part 420 would be effluent concentrations in lieu of the daily maximum production-based mass effluent limitations guidelines and standards. These daily maximum concentrations would be those concentrations used to develop the proposed production-based mass effluent limitations guidelines and standards.

The Agency believes that, under most circumstances, the approach under Alternative D would effectively address potential issues regarding short-term peaks in production (see Section 15.3). This approach would place no additional burden on the industry and permit writers applying for and writing NPDES or pretreatment permits. Permit authorities may need to revise their automated compliance tracking systems to account for both mass-based and concentration-based limitations at the same outfall; however, setting both mass-based and concentration-based limits at the same outfall is common in many NPDES and pretreatment permits issued prior to the proposed Iron and Steel rule.

This approach would also provide some flexibility for the industry when, due to historical conditions, relatively high volumes of storm water from intense rainfall events are collected and treated with process wastewater. In some cases, the volume of storm water collected and treated may cause short-term peak discharge flow rates that exceed the normal process wastewater discharge flow and violate the daily-maximum limitations. However, the Agency believes that treatment of such storm water volume is beneficial. The combination of maximum monthly average mass-based limits and daily-maximum concentration-based limits would provide the flexibility to account for this situation.

EPA has solicited comments on these alternative approaches to determining the proposed production bases for NPDES permit effluent limitations and pretreatment requirements. The Agency has also sought comments on related costs and any technical difficulties associated with meeting limits during short periods of high production. In addition, EPA has solicited other options for consideration.

15.4 Applications of Best Professional Judgement

Section 402(a)(1) of the CWA and the NPDES permit regulations at §122.44(a) and §125.3 authorize permit authorities to use BPJ in the absence of categorical effluent limitations to establish NPDES permit effluent limitations. When developing the proposed Iron and Steel regulation, the Agency attempted to minimize the need for BPJ determinations by taking into account all process wastestreams commonly generated at each manufacturing process and, where evident, miscellaneous process-related wastestreams (e.g., those generated in roll shops and from building basement sumps). The Agency recognizes, however, that some sites may generate nonprocess wastestreams and wastestreams that meet the definition of process wastewater (see §122.2) that were not accounted for in the development of the proposed effluent limitations guidelines and pretreatment standards for existing sources. To assist permit writers in addressing such wastestreams and to minimize the number of requests for fundamentally different factors variances, EPA has proposed at §420.3(f) a provision that would authorize permit writers to provide for increased loadings for wastewater sources not included in the development of the proposed regulation if these sources generate an increased discharge flow.

Such wastewater sources may include ground water remediation flows that can effectively be co-treated with process wastewater in the process wastewater treatment systems (i.e., ground water remediation water at a coke plant). In these cases, the permit writer would first calculate the mass effluent limitations for the regulated process, then calculate mass loadings for the wastestream using a reasonable measure of the wastewater flow rates and concentrations used by the Agency to develop the effluent limitations guidelines and standards for that process. The NPDES permit or pretreatment limitations would be the sum of those mass loadings (see Example 4 in Section 15.5.2). The provision at §420.3(f) is not meant to address co-treatment of wastewater from multiple subcategories within Part 420 or co-treatment of wastewater from other categories (see Section 15.5).

15.5 Calculating NPDES and Pretreatment Effluent Limitations

To ensure a revised Part 420 is applied consistently and appropriately, the Agency is considering alternative approaches to defining the "reasonable measure of actual production" used to calculate NPDES and pretreatment permit limits (see Section 15.3). In any of these approaches, EPA proposes the revised Part 420 to be applied in a building-block manner. Permit writers would multiply the effluent limitations guidelines and standards for each process operation by the respective reasonable measure of actual production. Permit writers would sum the resulting mass effluent limitations for each process to determine the NPDES or pretreatment limits applicable to the wastewater treatment system discharge for those processes.

This subsection provides examples for calculating NPDES and pretreatment permit limits where process wastewater discharges from the same operation and same category are co-treated, where wastewater discharges from operations in different subcategories are co-treated, and where there are miscellaneous process wastewater discharges. This subsection also provides an example of how to derive alternative effluent limitations guidelines and standards under the proposed "water bubble" provision.

When promulgating the 1982 regulation, EPA recognized that the iron and steel industry extensively co-treated compatible wastestreams as a cost-effective means of wastewater treatment. EPA structured the proposed regulation to facilitate co-treatment of compatible wastestreams in centralized treatment systems and discourage co-treatment of wastestreams that the Agency deems incompatible. For example, the Agency determined that co-treatment of wastestreams from by-product cokemaking operations and BOF steelmaking operations could increase discharges of toxic pollutants from cokemaking operations. The following table presents groups of subcategories for which the proposed regulation is structured to facilitate co-treatment. In some cases, pretreating selected wastestreams would effectively minimize the overall pollutant discharge.

Group 1	Cokemaking		
Group 2	Ironmaking	Sintering	
		Blast furnaces	
Group 3	Carbon Steel	Steelmaking	BOF steelmaking
			Vacuum degassing
			Continuous casting
		Hot forming	
		Steel finishing	
Group 4	Stainless Steel	Steelmaking	BOF steelmaking
			Vacuum degassing
			Continuous casting
		Hot forming	
		Steel finishing	

The Agency selected pollutants for regulation in each of these groups to allow facilities to co-treat their wastestreams where feasible. EPA is requesting comments on this approach.

15.5.1 Direct Dischargers

Example 1: Two iron and steel processes within the same category; no nonregulated process wastewater.

In this example, a facility has two blast furnaces and treats their process wastewater in a dedicated blast furnace gas cleaning water treatment and recycle system. The reasonable measure of actual production (NPDES permit production rate) is 4,500 tons/day for one furnace and 3,900 tons/day for the other. The facility also has a sinter plant with wet air pollution controls equipped with a dedicated treatment and recycle system. The facility discharges blowdown from that recycle system into the blast furnace treatment and recycle system; the only discharge from these operations is the blowdown from the blast furnace treatment and recycle system. The NPDES production rate for the sinter plant is 4,100 tons/day. Table 15-1 presents the calculations illustrating how the effluent limitations guidelines are applied in this case. For this example, the TSS and O&G limitations are derived from the proposed regulation and reflect the BPT limitations from the 1982 regulation. Note that the 2,3,7,8-TCDF limitation applicable to sinter plant wastewater is applied to the combined wastewater discharge

from the sinter plant and blast furnaces as a daily maximum concentration limit less than the defined *minimum level* of 10 parts per quadrillion (ppq).[1]

Example 2: Multiple processes within the same category; presence of nonregulated process wastewater.

In this example, the NPDES production rates for a stainless steel finishing mill with wastestreams treated in a centralized wastewater treatment system are as follows.

Descaling and acid pickling	900	tons/day
Cold rolling--recirculation-multiple stands	870	tons/day
Alkaline cleaning	870	tons/day

The pickling line is equipped with two fume scrubbers. The mill has a steel coating operation that is not regulated by Part 420 or any other categorical effluent limitation guideline. The reasonable measure of discharge flow for the nonregulated stream is 50 gallons per minute (gpm). Table 15-2 presents the calculations illustrating how the limitations are applied in this case. As in Example 1, the TSS and O&G limitations are derived from the proposed regulation and reflect the BPT effluent limitations guidelines from the 1982 regulation.

Effluent limitations for the 50 gpm of nonregulated process wastewater are calculated in accordance with the proposed §420.3(d), which provides the permit writer with the authority to consider such flows when developing pretreatment limits or technology-based effluent limitations in NPDES permits. In this example, the mass-based effluent limits were derived from the reasonable measure of actual flow (i.e., 50 gpm) and the concentrations used to derive the effluent limitations guidelines and standards for stainless steel finishing operations (see Table 12-3). The resulting mass-based limits were added to the mass limits for the regulated processes to determine the NPDES permit limits applicable to the discharge from the wastewater treatment facility.

Example 3: Multiple processes from different subcategories; no nonregulated process wastewater.

This example is an integrated steel mill with separate treatment and recycle systems for BOF steelmaking with wet-open combustion air emission controls, a vacuum degassing plant, a continuous slab caster, and a hot strip mill. The blowdown streams from the vacuum degassing plant and the continuous caster cascade into the BOF treatment and recycle system. The facility combines the blowdown streams from the hot strip mill and BOF recycle systems for treatment of

[1]Direct and indirect dischargers must demonstrate compliance with the effluent limitations and standards for 2,3,7,8-TCDF at the point after treatment of sinter plant wastewater separately or in combination with blast furnace wastewater, but prior to mixing with any other process or nonprocess wastewaters or noncontact cooling waters.

toxic metals in a blowdown treatment system. The NPDES production rates for these operations are listed below.

BOF - wet-open combustion	8,500	tons/day
Vacuum degassing	6,800	tons/day
Continuous casting	8,450	tons/day
Hot strip mill	8,375	tons/day

Table 15-3 presents the calculations illustrating how the effluent limitations guidelines are applied in this example.

15.5.2 Indirect Dischargers

40 CFR Part 403 classifies wastewater that can be discharged from industrial facilities to POTWs as follows:

- *Regulated* - Wastewater regulated by categorical pretreatment standards, such as those contained in the proposed rule;
- *Unregulated* - Wastewater that is not regulated by categorical pretreatment standards and is not *dilute* wastewater; and
- *Dilute* - Sanitary wastewater, noncontact cooling water, boiler blowdown, and other wastestreams listed in Appendix D to Part 403.

For indirect iron and steel dischargers whose wastestreams are not co-treated with wastewater from other industrial categories, the control authority would derive mass-based pretreatment limits from the proposed pretreatment standards similarly to how NPDES permit limits are derived for direct dischargers. In this case, all of the wastewater is *regulated*, and the pretreatment authority would apply the pretreatment limits either at the point of discharge from the facility's wastewater treatment facility or at the point of discharge to the POTW, whichever point the control authority determines is appropriate based on site circumstances.

Where the above circumstances apply and there are other wastestreams present that would be regulated under the proposed rule (§420.3(d)), the pretreatment authority would calculate the applicable categorical pretreatment limits as described below in Example 4. In this case, the pretreatment authority would add incremental mass limits for the wastestreams regulated under §420.3(d) to the limits derived for the regulated wastewater to determine the appropriate categorical pretreatment limits.

Where facilities combine regulated wastestreams under the proposed rule and dilute wastewater, the pretreatment authority can either: (1) apply the categorical pretreatment

limits at an internal monitoring point where dilution is not a factor, under authority of §403.6(e)(2) and (4); or (2) apply the categorical pretreatment limits in terms of mass at a location after the regulated and dilute wastestreams are combined, provided the dilution is not so great as to interfere with compliance determinations.

Where facilities co-treat their iron and steel wastestreams with wastestreams from other industrial categories that are regulated under other categorical pretreatment standards, the pretreatment authority can either derive pretreatment standards for the combined wastestreams by using a building-block approach or use the "combined wastestream formula" set out at §403.6(e) and shown in the formula below:

$$C_T = \frac{\sum C_I F_I}{\sum F_I} \times \frac{F_T - F_D}{F_T} \qquad (15\text{-}1)$$

where:

C_T = The alternate concentration limit for the combined wastestream, mg/L

C_I = The categorical pretreatment standard concentration limit for a pollutant in the regulated stream I, mg/L

F_I = The average daily flow of stream I, L/day

F_D = The average daily flow from dilute wastestreams as defined in Part 403, L/day

F_T = The total daily flow, L/day.

See Reference 15-3 for more information on the combined wastestream formula.

As with direct dischargers, in circumstances where the pretreatment standards applicable to one category regulate a different set of pollutants than the standards applicable to another category, the control authority must ensure that the guidelines are properly applied. If a pollutant is regulated in one wastestream but not another, the control authority must ensure that the nonregulated pollutant stream does not dilute the regulated pollutant stream to the point where pollutants are not analytically detectable. If this level of dilution occurs, the control authority most likely would establish internal monitoring points, as authorized under 40 CFR Part 403.6(e)(2) and (4).

Example 4: Indirectly discharging coke plant; co-treatment of ground water from remediation project.

In this example, an indirectly discharging by-product coke plant has an active ground water remediation project that generates a continuous flow of 35 gpm; this wastestream

contains benzene, phenol, ammonia as nitrogen, and other pollutants characteristic of coke plant wastewater. Because the untreated ground water is compatible for treatment with untreated coke plant process wastewater, the Agency determined that it is appropriate to co-treat these two waste streams. In this example, benzene in the ground water would be removed in the ammonia still and returned to the coke oven gas, ammonia would be removed in the ammonia still and downstream treatment, and phenol would be removed either at the coke plant (depending upon the type of treatment provided) or at the POTW. The Agency has determined that phenol is compatible with biological treatment at POTWs and does not pass through.

The approach used in this example has the same effect as applying the combined wastestream formula from the pretreatment regulations reviewed above; however, the proposed rule allows both direct and indirect dischargers to treat combinations of regulated and unregulated wastestreams. Table 15-4 presents the derivation of pretreatment limits for both PSES options being considered by the Agency.

15.6 Water Bubble

The "water bubble" is a regulatory mechanism set out in the 1982 regulation (40 CFR 420.03) to allow an iron and steel facility to trade pollutants between multiple NPDES permit compliance points within the facility. Some facilities have used the water bubble to save costs and others to improve prospects for compliance. The provision is structured to also benefit the environment.

The water bubble provisions of the 1982 rule and the proposed rule allow alternative effluent limitations where a facility, in effect, trades pollutant discharges from one outfall or NPDES permit compliance monitoring point to another. Unlike variances, facilities may use the water bubble wherever they can meet the conditions governing the use of the water bubble.

The water bubble provision in the 1982 rule has the following restrictions:

- Trades can be made only for like pollutants (e.g., lead for lead, not lead for zinc);
- Alternative effluent limitations resulting from the application of the water bubble must comply with applicable water quality standards;
- Each outfall must have specific fixed limitations for the term of the permit;
- Trades involving cokemaking and cold rolling operations are prohibited;
- Each trade must result in a minimum net reduction in pollutant loading (15 percent for TSS and O&G, and 10 percent for all other traded pollutants); and

- Only existing sources may apply the water bubble.

Currently, NPDES permits for only nine iron and steel facilities have alternative effluent limitations derived from the water bubble; however, the Agency anticipates that there may be increased interest in the water bubble with the promulgation of a revised rule. Therefore, EPA proposes to make the following changes to the water bubble provision:

- Allow trades for by-product cokemaking operations, but only where the alternative limitations for cokemaking would be more stringent than the generally applicable limitations. This change would provide additional flexibility for certain facilities yet ensure that there would be no increased discharge of toxic organic and other pollutants associated with cokemaking operations.

- Restrict trades in the same manner for sinter plants as for by-product cokemaking operations due to the potential for discharges of dioxins and furans.

- Prohibit trades of O&G because of differences in the types of oil and grease used among iron and steel operations (finishing operations tend to use and discharge synthetic and animal fats and oils used to lubricate metals, the hot-end operations tend to discharge petroleum-based oil and grease used to lubricate machinery, and cokemaking operations tend to discharge oil and grease containing polynuclear aromatics generated by the combustion of coal).

- Allow trades for cold rolling operations.

- Allow trades for new as well as existing sources. Because the existing source environmental gain is 10 percent for all parameters except for TSS, which is 15 percent, EPA is considering whether a higher net gain (e.g., 20 percent) is appropriate for new sources given their flexibility in design.

EPA is proposing to change the 1982 regulation to prohibit trading of O&G between outfalls. As noted above, EPA is concerned that different types of oil and grease may be discharged by different process units, and that trading might increase the amount of a more environmentally harmful type of oil and grease (e.g., petroleum based), while reducing the amount of a less harmful type (e.g., animal fats). EPA recognizes that facilities will generally identify trades that save money. The Agency has no data to suggest that the most economically beneficial trading opportunities (i.e., those facilities will likely use) would systematically either decrease or increase discharges of the most harmful types of oil and grease. Given that facilities must decrease O&G discharge across all outfalls by 15 percent to trade under the existing rule, even if an individual trade might increase discharges of petroleum-based oil and grease, the net effect would still benefit the environment and save the facility costs.

When estimating the incremental investment and operating and maintenance costs associated with the proposed regulation, the Agency assumed that no facilities would use the water bubble. Consequently, any use of the water bubble would represent cost savings.

Table 15-5 presents an example of the water bubble used for a trade of zinc for the facilities identified above in Examples 1 and 3 (see Tables 15-1 and 15-3). Note that in this example trade, EPA assigned the sinter plant/blast furnace operations more stringent limitations; this outcome would be allowed with the proposed restriction on trades for sinter plant operations.

15.7 Monitoring Requirements

The NPDES permit regulations at §122.41(j)(4) and the pretreatment regulations at §403.12(b)(5)(vi) require that facilities conduct sampling and analyses for compliance monitoring purposes according to the techniques set out at 40 CFR Part 136, as amended. Table 15-6 presents the sampling and analytical methods for those pollutants regulated under the proposed rule (see Part 136 and the analytical methods for sample handling, sample holding time, and approved sample containers). Note that there is no method specified in Part 136 for thiocyanate. The Agency recommends that permit authorities specify analytical method 4500 CN M from the most current edition of Standard Methods for the Examination of Water and Wastewater (Reference 15-4).

The Agency has not proposed specific monitoring requirements or monitoring frequencies in the Iron and Steel regulation; therefore, permit authorities may establish monitoring requirements and monitoring frequencies at their discretion. Sections 15.7.1 through 15.7.3 provide guidance on establishing these requirements.

15.7.1 Sample Types

EPA recommends flow-proportioned, 24-hour composite samples for the following pollutants:

- TSS;
- Ammonia as nitrogen;
- Total cyanide;
- Phenol;
- Thiocyanate;
- 2,3,7,8-TCDF;
- Benzo-*a*-pyrene;
- Naphthalene;
- Hexavalent chromium;
- Total chromium;
- Total lead;
- Total nickel;
- Total mercury;

- Total selenium; and
- Total zinc.

Part 136 requires facilities to collect grab samples for O&G. Several iron and steel permits are written to require collection of three grab samples for O&G in a 24-hour monitoring day, with the results averaged to represent a daily sample. The sample types for pH can range from a one-time grab sample during a monitoring day for operations where pH is usually not a control parameter (e.g., continuous casting, hot forming) to continuous sampling where pH is a critical aspect of the wastewater to be treated or a critical control parameter for operation of wastewater treatment facilities (e.g., steel finishing and other subcategories where metals precipitation is a control technology).

15.7.2 Monitoring Frequency

The monitoring frequencies specified in iron and steel NPDES permits vary depending upon the size of the facility, potential impacts on receiving waters, compliance history, and other factors, including monitoring policies or regulations required by permit authorities. A few iron and steel permits for large mills have required monitoring for all limited pollutants as frequently as five times per week. Other permits for less complex facilities require twice monthly monitoring. When developing the proposed rule, EPA considered a monitoring frequency of once per week for limited pollutants, except for 2,3,7,8-TCDD, for which the Agency considered a monthly monitoring frequency. Most NPDES permits for iron and steel facilities require facilities to continuously monitor and record their discharge flow rates and report daily 24-hour total flow.

Facilities may monitor effluent more frequently than specified in their permits; however, the results must be reported in accordance with §122.41(l)(4)(ii).

15.7.3 Compliance Monitoring Locations

The NPDES permit regulations at §122.41(j)(1) require that samples and measurements taken for the purpose of monitoring be representative of the monitored activity and §125.3(e) requires that technology-based effluent limits be applied prior to or at the point of discharge. The pretreatment regulations at §403(d) prohibit facilities from diluting their wastewater to meet categorical pretreatment standards. The discharge from a wastewater treatment facility is usually a point where measurements will be most representative of the treated effluent. Under circumstances where dilution with relatively low volumes of noncontact cooling water or storm water will not interfere with compliance determinations, permit writers may apply the technology-based effluent limits at the point of discharge to a receiving water or to a POTW.

In the proposed regulation at §420.6(b) EPA has given permit writers the flexibility to apply pH effluent limitations at the point of discharge from a wastewater treatment facility or at the point of discharge to a receiving water. This mechanism is designed to prevent the need for facilities to reneutralize their treated wastewater to a pH of 6.0 to 9.0 if they can

achieve the same end by mixing treated wastewater with nonregulated wastewater, such as large volumes of noncontact cooling water.

15.8 Best Management Practices

BMPs are measures to prevent or mitigate water pollution from sources ancillary to the industrial manufacturing or treatment process. The NPDES regulations at §122.2 define the term "best management practices" and provide the following measures as examples:

- Schedules of activities;
- Prohibition of practices;
- Maintenance procedures;
- Treatment requirements; and
- Operating procedures and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, and drainage from raw material storage areas.

The NPDES regulations at §122.44(k) allows BMPs to be included as permit conditions (when applicable) where they are authorized under Section 304(e) of the CWA when numeric effluent limitations are not feasible or when BMPs are necessary to meet the limitations or carry out the purpose and intent of the CWA. Examples of when numeric effluent limitations are not feasible include the following:

- When chemical analyses are inappropriate or impossible;
- When a history of leaks and spills exists or when housekeeping is sloppy;
- When a complex facility lacks toxic pollutant data; and
- When other discharge control options are prohibitively expensive.

Permit writers may include BMPs in permits in two ways: they may require the development of a general BMP plan and/or require site-, process-, or pollutant-specific BMPs. Because individual permits instead of general permits are issued to iron and steel facilities, permit writers usually require site-specific or pollutant-specific BMPs where appropriate.

The Guidance Manual for Developing Best Management Practices (BMPs) (Reference 15-5) presents additional information about BMPs and describes industrial activities and materials that are best addressed by BMP plans. EPA has identified several recommended components for effective BMP plans for the iron and steel industry. The minimum suggested components of a general BMP plan are presented below (Reference 15-5 discusses each of these components in more detail).

- General requirements:
  - Name and location of facility;
  - Statement of BMP policy and objective; and
  - Review by plant manager.

- Specific requirements:
  - BMP committee;
  - Risk identification and assessment;
  - Reporting of BMP incidents;
  - Materials compatibility;
  - Good housekeeping;
  - Preventive maintenance;
  - Inspections and records;
  - Security; and
  - Employee training.

The Preliminary Study of the Iron and Steel Category (Reference 15-6) identifies the activities listed below as possible BMPs for iron and steel facilities. EPA advises permit writers to apply or require BMPs in instances where site-specific circumstances warrant the application of BMPs such as the following:

- Control of spillage and losses from raw material handling operations (i.e., ore docks, coal handling);

- Control of runoff from raw material storage piles, including piles of coal, coke, iron ore, limestone, and scrap steel;

- Control of fugitive discharges of process wastewater and process materials to coke plant, blast furnace, and sinter plant noncontact cooling water;

- Control of coke oven and blast furnace gas condensates;

- Control of runoff/leachate and ground-water contamination from blast furnace slag pits located at blast furnaces;

- Control of runoff from blast furnace and steelmaking slag processing operations located at the furnaces and in remote areas;

- Control of runoff from electronic arc furnace (EAF) dust collection areas;

- Control of spillage and runoff from loading stations for rolling solutions and pickling acids; and

- Surveillance and corrective action programs for oil discharges from noncontact cooling water discharges.

In addition, BMPs could also be applied in the form of periodic (e.g., once during the term of a five-year permit) engineering reviews of the design and operation of wastewater treatment systems to ensure facilities schedule increases in capacity, major maintenance items, and replacement of treatment units as needed. Many existing steel industry wastewater treatment systems were first designed and installed during the 1960s and 1970s. The Agency believes that, for the most part, these systems have been properly operated and well maintained. For these facilities, BMPs would help identify those systems that require major maintenance or replacement in the near term.

15.9 Bypasses and Upsets

The CWA, the NPDES permit regulations at §122.41(m) and (n), and the pretreatment regulations at §403.16 and §403.17 allow effluent discharges in excess of permit limits under certain exceptional and limited circumstances. A *bypass* is an intentional diversion of a wastestream from any portion of a treatment facility to prevent unavoidable loss of life, personal injury, or severe property damage. Economic loss caused by delays in production does not constitute severe property damage for the purposes of this regulation. The key requirements for the bypass provisions of a permit are (1) the bypass must be intentional; (2) prior notice (10 days, if possible) must be provided; and (3) there must be no feasible alternatives to the bypass. A facility cannot meet these requirements if it lacks adequate back-up equipment that it should have installed to prevent a bypass during periods of normal operation or maintenance using reasonable engineering judgement. Intentional bypasses are allowed only if required for essential maintenance to ensure efficient operation, as long as these bypasses do not cause the facility to exceed its effluent limitations.

An *upset* is an exceptional incident in which a facility unintentionally and temporarily cannot comply with its technology-based permit effluent limitations due to factors beyond its reasonable control. An upset does not include noncompliance due to operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventative maintenance, or careless or improper operation. An upset can be an affirmative defense for effluent limitation exceedances provided that the permit holder demonstrates the following: the cause of the upset can be identified, the permitted facility was being properly operated at the time of the upset, and the permit holder made the required 24-hour notification. In any enforcement proceeding, the burden of proof is on the permit holder to demonstrate an upset has occurred through properly signed operating logs or other relevant evidence.

Because Section 510 of the CWA authorizes permit authorities to include more stringent controls than in permits than one contained in the federal regulations, any bypass and upset provisions must be included in permits issued by permit authorities to become available to permit holders. Permit authorities should anticipate that permit holders with properly designed

and operated wastewater treatment systems would have very few, if any, bypasses or upsets that meet the above criteria in the course of a five-year NPDES permit.

15.10 NPDES Permit and Pretreatment Variances

The CWA and the NPDES permit regulations allow certain variances from technology-based effluent limitations guidelines and standards for exceptional cases. The water bubble provisions of the 1982 rule and the proposed regulation at §420.4 allow alternative effluent limitations where a facility can trade pollutant discharges from one outfall or NPDES permit compliance monitoring point to another. Unlike variances, facilities may use the water bubble wherever they can meet the conditions governing use of the water bubble. As opposed to the bypass and upset provisions that are applicable within the term of a permit, the permit writer develops the variance and alternative limitations at the time of draft permit renewal so that the variance and alternative limitations are subject to public review and comment at the same time the entire permit is put on public notice. The variance and alternative limitations remain in effect for the term of a permit, unless the permit writer modifies it prior to expiration.

A permit applicant must meet specific data requirements before a variance is granted. As the term implies, a variance is an unusual situation, and the permit writer should not expect to routinely receive variance requests. The permit writer should consult 40 CFR §124.62 for procedures on making decisions on the different types of variances.

15.10.1 Economic Variances

Section 301(c) of the CWA allows a variance for nonconventional pollutants from technology-based BAT effluent limitations due to economic factors, at the request of the facility and on a case-by-case basis. There are no implementing regulations for §301(c); rather, variance requests must be made and reviewed based on the statutory language in CWA §301(c). The economic variance may also apply to non-guideline limits in accordance with 40 CFR §122.21(m)(2)(ii). The applicant normally files the request for a variance from effluent limitations developed from BAT guidelines during the public notice period for the draft permit. Other filing time periods may apply, as specified in 40 CFR §122.21(m)(2). The variance application must show that the modified requirements:

1) Represent the maximum use of technology within the economic capability of the owner or operator; and

2) Result in further progress toward the goal of discharging no process wastewater.

Facilities in industrial categories other than utilities must conduct three financial tests to determine if they are eligible for a 301(c) variance. Guidance for conducting the financial tests is available from EPA's Office of Wastewater Management. Generally, EPA will grant a variance only if all three tests indicate that the required pollution control is not economically

achievable, and the applicant makes the requisite demonstration regarding "reasonable further progress."

With respect to the second requirement for a 301(c) modification, the applicant must, at a minimum, demonstrate compliance with all applicable BPT limitations and pertinent water-quality standards. In addition, the proposed alternative requirements must reasonably improve the applicant's discharge.

15.10.2 Variances Based on Localized Environmental Factors

Section 301(g) of the CWA allows a variance for certain nonconventional pollutants (ammonia, chlorine, color, iron, and total phenols) from BAT effluent limitations guidelines due to local environmental factors. The discharger must file a variance application that shows the following:

- The modified requirements result in compliance with BPT and water-quality standards of the receiving stream;
- Other point or nonpoint source discharges will not need additional treatment as a result of the variance approval; and
- The modified requirements will not interfere with protection of public water supplies or with protection and propagation of a balanced population of shellfish, fish, and wildfowl, and will allow recreational activities in and on the water. Also, the modified requirements will not result in quantities of pollutants that may reasonably be anticipated to pose an unacceptable risk to human health or the environment, cause acute or chronic toxicity, or promote synergistic properties.

Section 301(g) also allows petitioners to add other nonconventional pollutants to the variance list upon petition to the Administrator. The petitioner must demonstrate that the pollutants do not exhibit the characteristics of toxic pollutants. Certain time restrictions and other conditions also apply (see Section 301(g)(4)(C)).

Permit writers must review the request to ensure that it complies with each of the requirements for this type of variance. The 301(g) variance request involves significant water-quality assessment, including aquatic toxicity, mixing zone, and dilution model analyses, and the possible development of site-specific criteria. In addition, many complex human health effects must be assessed, including carcinogenicity, teratogenicity, mutagenicity, bioaccumulation, and synergistic propensities. Permit writers should use EPA's Draft 301(g) Technical Guidance Manual (Reference 15-7) in assessing variance requests.

Several Section 301(g) variances have been granted for iron and steel facilities. Most of these have been for ammonia as nitrogen and total phenols discharged from blast furnace

operations. The proposed regulation contains effluent limitations guidelines and standards for phenol rather than total phenols. Consequently, the ability of some permit holders to obtain Section 301(g) variances may be limited because phenol is a designated priority pollutant for which 301(g) variances are not available.

15.10.3 Fundamentally Different Factors Variances

Section 301(n) of the CWA allows variances based upon fundamentally different factors (FDF) for BAT and BCT pollutants, while 40 CFR Part 125, Subpart D provides the regulatory authority for BPT variances. A direct discharger can receive an FDF variance from effluent limitations guidelines for priority, conventional, and nonconventional pollutants if the facility is found to be fundamentally different from the factors considered in establishing the effluent guidelines. There is no FDF variance allowed from NSPS. The facility must file the FDF variance for BPT by the close of the public comment period for the permit under 40 CFR §124.10, and request the FDF variance for BAT or BCT within 180 days of the guideline promulgation. Where an FDF variance request is approved, calculated alternative limits cannot be any less stringent than justified by the fundamental difference and cannot cause violations of water-quality standards. FDF variances may result in more or less stringent effluent limitations than those derived from the generally applicable effluent limitations guidelines.

Factors required to justify a BPT FDF variance related to a discharger's facilities, equipment, processes, and compliance costs must be different from those considered in the development of the guidelines. Factors for BAT and BCT variance requests are similar except that cost cannot be considered. Additional factors that cannot be considered for any FDF variance request include the feasibility of installing the necessary treatment within the given time frame, a claim that the limits cannot be achieved with the given technology (unless supported with data), the discharger's ability to pay, or the impact on local receiving water quality. Permit writers review FDF variances on a case-by-case basis. The burden of proof lies with the facility requesting the variance.

15.10.4 Thermal Discharge Variances

Section 316(a) of the CWA allows variances from effluent limitations for the thermal component of a discharge. Regulations for submitting and reviewing thermal discharge variance requests are promulgated at 40 CFR Part 125, Subpart H. Permits may include less stringent alternative thermal effluent limits if the discharger demonstrates that such limits are more stringent than necessary to ensure the protection and propagation of a balanced, indigenous community of shellfish, fish, and wildlife in and on the body of water into which the discharge is made, taking into account the cumulative impact of its thermal discharge together with all other significant impacts on the species affected.

15.10.5 Net Credits

In some cases, solely as a result of the level of pollutants in the intake water, facilities find it difficult or impossible to meet technology-based limits with BAT/BCT technology. Under certain circumstances, the NPDES regulations allow credit for pollutants in intake water. 40 CFR §122.45(g) establishes the following requirements for net limitations:

- Credit for generic pollutants, such as BOD_5 or TSS, are authorized only where the constituents resulting in the effluent biological oxygen demand and TSS are similar between the intake water and the discharge;
- Credit is authorized only up to the extent necessary to meet the applicable limitation or standard, with a maximum value equal to the influent concentration;
- Intake water must be taken from the same body of water into which the discharge is made; and
- Net credits do not apply to the discharge of raw water clarifier sludge generated during the treatment of intake water.

Permit writers are authorized to grant net credits for the quantity of pollutants in the intake water where the applicable effluent limitations guidelines and standards specify that the guidelines are to be applied on a net basis or where the pollution control technology would, if properly installed and operated, meet applicable effluent guidelines limitations and standards in the absence of the pollutants in the intake waters. EPA has specified in the proposed rule that effluent limitations guidelines and standards are to be applied on a gross basis.

15.11 References

15-1 U.S. Environmental Protection Agency. NPDES Permit Writer's Manual. EPA 833/B-96-003. Washington, D.C., December 1996.

15-2 U.S. Environmental Protection Agency. Industrial User Permitting Guidance Manual. EPA 833/R-89-001. Washington, D.C., September 29, 1989.

15-3 U.S. Environmental Protection Agency. Guidance Manual for the Use of Production-Based Pretreatment Standards and the Combined Wastestream Formula. EPA 833/B-85-201. Washington, D.C., September 1985.

15-4 American Public Health Association, American Water Works Association, and Water Pollution Control Federation. Standard Methods for the Examination of Water and Wastewater, 20th edition. Washington, D.C., 1998.

15-5 U.S. Environmental Protection Agency. Guidance Manual for Developing Best Management Practices (BMPs). EPA 833/B-93-004. Washington, D.C., 1993.

15-6 U.S. Environmental Protection Agency. Preliminary Study of the Iron and Steel Category: 40 CFR Part 420 Effluent Limitations Guidelines and Standards. EPA 821-R-95-037. Washington, D.C., September 1995.

15-7 U.S. Environmental Protection Agency. Draft 301(g) Technical Guidance Manual. Washington, D.C., 1984.

Table 15-1

Example 1: Application of the Proposed 40 CFR Part 420 Direct Discharge Blast Furnaces and Sinter Plant

BPT/BAT											
Operation	**Production (tons/day)**	**Total Suspended Solids**		**Oil and Grease**		**Ammonia-N**		**Total Cyanide**		**Phenol**	
		Maximum	**Average**	**Maximum**	**Average**	**Maximum**	**Average**	**Maximum**	**Average**	**Max**	**Average**
Blast Furnace A	4,500	0.1564 703.8	0.052 234	-	-	0.000217 0.9765	0.0000977 0.43965	0.00164 7.38	0.000623 2.8035	0.0000154 0.0693	0.00000523 0.023535
Blast Furnace B	3,900	0.1564 609.96	0.052 202.8	-	-	0.000217 0.8463	0.0000977 0.38103	0.00164 6.396	0.000623 2.4297	0.0000154 0.06006	0.00000523 0.020397
Sintering	4,100	0.1502 615.82	0.05 205	0.03 123	0.01002 41.082	0.000652 2.6732	0.000293 1.2013	0.00493 20.213	0.00187 7.667	0.0000463 0.18983	0.0000157 0.06437
NPDES Permit Limits											
Total Mass Limitations (lbs/day)		**1,930**	**642**	**123**	**41.1**	**4.50**	**2.02**	**34.0**	**12.9**	**0.32**	**0.11**
Total Mass Limitations (kg/day)		**875**	**291**	**56**	**18.6**	**2.04**	**0.92**	**15.42**	**5.85**	**0.14**	**0.05**

Operation	**Production (tons/day)**	**Total Lead**		**Total Zinc**		**Total Residual Chlorine**		**2,3,7,8-TCDF**			
		Maximum	**Average**	**Maximum**	**Average**	**Maximum**	**Average**	**Maximum**	**Average**		
Blast Furnace A	4,500	0.0000304 0.1368	0.0000159 0.07155	0.0000387 0.17415	0.0000152 0.0684	0.0000261 0.11745	-	-	-		
Blast Furnace B	3,900	0.0000304 0.11856	0.0000159 0.06201	0.0000387 0.15093	0.0000152 0.05928	0.00104 4.056	-	-	-		
Sintering	4,100	0.0000913 0.37433	0.0000476 0.19516	0.000116 0.4756	0.0000457 0.18737	0.000313 1.2833	-	< ML	-		
NPDES Permit Limits											
Total Mass Limitations (lbs/day)		**0.63**	**0.33**	**0.80**	**0.32**	**5.46**	**-**	**-**	**-**		
Total Mass Limitations (kg/day)		**0.29**	**0.15**	**0.36**	**0.14**	**2.48**	**-**	**-**	**-**		
Other Limitations								**ND (10 ppq)**			

Table 15-2

Example 2: Application of Proposed 40 CFR Part 420 Direct Discharge Stainless Steel Finishing Mill

BPT/BAT

Operation	Production (tons/day)	Total Suspended Solids		Oil and Grease		Ammonia-N		Total Chromium		Hexavalent Chromium	
		Maximum	Average	Maximum	Average	Maximum	Average	Maximum	Average	Max	Average
Descaling and Pickling -Strip, Sheet	900	0.876 788.4	0.376 338.4	0.376 338.4	0.1252 112.68	0.133 119.7	0.0873 78.57	0.00152 1.368	0.000854 0.7686	0.000969 0.8721	0.000595 0.5355
Fume Scrubbers	2	12.6 25.2	5.4 10.8	5.4 10.8	1.8 3.6	4.1 8.2	2.69 5.4	0.313 0.6	0.176 0.4	0.199 0.4	0.122 0.2
Cold Rolling Mult. Stand Recirc.	870	0.01252 10.89	0.00626 5.45	0.00522 4.54	0.00208 1.81	0.00304 2.64	0.00199 1.73	0.0000348 0.03	0.0000195 0.02	0.0000221 0.02	0.0000136 0.01
Alkaline Cleaning Strip, Sheet	870	0.204 177.48	0.0876 76.21	0.0876 76.21	0.0292 25.40	0.475 413.25	0.312 271.44	0.00543 4.72	0.00305 2.65	0.00346 3.01	0.00213 1.85
Unregulated Process Water	50 gpm	70 42.06	30 18.03	30 18.03	10 6.01	22.75 13.67	14.94 8.98	0.26025 0.16	0.14611 0.09	0.17 0.10	0.1 0.06
NPDES Permit Limits											
Total Mass Limitations (lbs/day)		**1,044**	**449**	**448**	**150**	**557**	**366**	**6.90**	**3.88**	**4.40**	**2.70**
Total Mass Limitations (kg/day)		**474**	**204**	**203**	**68**	**253**	**166**	**3.13**	**1.76**	**2.00**	**1.23**

Operation	Production (tons/day)	Total Nickel		Fluoride							
		Maximum	Average	Maximum	Average						
Descaling and Pickling -Strip, Sheet	900	0.000449 0.4041	0.000315 0.2835	0.136 122.4	0.108 97.2						
Fume Scrubbers	2	0.0923 0.2	0.0649 0.1	27.9 55.8	22.3 44.6						
Cold Rolling Mult. Stand Recirc.	870	0.0000103 0.01	0.00000721 0.01	0.00311 2.71	0.00248 2.16						
Alkaline Cleaning Strip, Sheet	870	0.0016 1.39	0.00113 0.98	0.485 421.95	0.387 336.69						
Unregulated Process Water	50 gpm	0.0768 0.05	0.054 0.03	23.25 13.97	18.54 11.14						
NPDES Permit Limits											
Total Mass Limitations (lbs/day)		**2.04**	**1.44**	**617**	**492**						
Total Mass Limitations (kg/day)		**0.92**	**0.65**	**280**	**223**						

Table 15-3

Example 3: Application of Proposed 40 CFR Part 420 Direct Discharge Integrated Steelmaking and Hot Forming

BPT/BAT									
Operation	**Production (tons/day)**	**Total Suspended Solids**		**Oil and Grease**		**Total Lead**		**Total Zinc**	
		Maximum	**Average**	**Maximum**	**Average**	**Maximum**	**Average**	**Maximum**	**Average**
BOF Wet Open Comb.	8,500	0.1374 1167.90	0.0458 389.30	-	-	0.0000243 0.21	0.0000127 0.11	0.0000279 0.24	0.0000159 0.14
Vacuum Degassing	6,800	0.0312 212.16	0.01042 70.86	-	-	0.0000209 0.14	0.0000119 0.08	0.0000209 0.14	0.0000119 0.08
Continuous Casting	8,450	0.16 1318.20	0.05 439.40	0.05 395.46	0.02 131.82	0.00 0.21	0.00 0.11	0.00 0.24	0.00 0.13
Hot Strip Mill	8,375	0.854 7152.25	0.32 2680.00	0.107 896.13	-	0.000122 1.02	0.0000634 0.53	0.000131 1.10	0.0000907 0.76
NPDES Permit Limits									
Total Mass Limitations (lbs/day)		**9,851**	**3,580**	**1292**	**132**	**1.58**	**0.83**	**1.71**	**1.11**
Total Mass Limitations (kg/day)		**4,468**	**1,624**	**586**	**60**	**0.71**	**0.38**	**0.78**	**0.50**

Table 15-4

Example 4: Application of Proposed 40 CFR Part 420 Indirect Discharge Coke Plant

PSES Option 1 - Physical/Chemical Treatment

Operation	Production (tons/day)	Ammonia as Nitrogen		Total Cyanide		Thiocyanate		Selenium		Naphthalene	
		Maximum	Average	Maximum	Average	Maximum	Average	Maximum	Average	Max	Average
Cokemaking	4,430	0.0845 374.34	0.0559 247.64	0.0244 108.09	0.0128 56.70	0.402 1780.86	0.317 1404.31	0.00125 5.54	0.00104 4.61	0.00268 11.87	0.000869 3.85
Ground Water Remediation	35 gpm	64.06 26.94	42.4 17.83	18.47 7.77	9.67 4.07	304.91 128.24	240.38 101.10	0.94835 0.40	0.78984 0.33	2.02878 0.85	0.65929 0.28
Pre-Treatment Limitations											
Total Mass Limitations (lbs/day)		**401**	**265**	**116**	**61**	**1,909**	**1,505**	**5.94**	**4.94**	**12.7**	**4.13**
Total Mass Limitations (kg/day)		**182**	**120**	**53**	**28**	**866**	**683**	**2.69**	**2.24**	**5.77**	**1.87**

PSES Option 2 - Physical/Chemical and Biological Treatment

Operation	Production (tons/day)	Ammonia as Nitrogen		Total Cyanide		Thiocyanate		Selenium		Naphthalene	
		Maximum	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum	Average
Cokemaking	4,430	0.00539 23.88	0.00357 15.82	0.00616 27.29	0.00422 18.69	0.00164 7.27	0.00115 5.09	0.000185 0.82	0.000159 0.70	0.000103 0.46	0.0000345 0.15
Ground Water Remediation	35 gpm	1.04 0.44	0.047 0.02	7.87 3.31	2.99 1.26	1.24 0.52	0.87 0.37	0.13994 0.06	0.12056 0.05	0.07829 0.03	0.02613 0.01
Pre-Treatment Limitations											
Total Mass Limitations (lbs/day)		**24**	**16**	**31**	**20**	**7.79**	**5.46**	**0.88**	**0.76**	**0.49**	**0.16**
Total Mass Limitations (kg/day)		**11**	**7**	**14**	**9**	**3.53**	**2.48**	**0.40**	**0.34**	**0.22**	**0.07**

Table 15-5

Example 5: Application of Proposed 40 CFR Part 420.4 Example "Water Bubble" Trade for Zinc

Blast Furnaces and Sinter Plant (Outfall 001)			
BPT/BAT			
Operation	**Production (tons/day)**	**Total Zinc**	
		Maximum	**Average**
Blast Furnace A	4,500	0.0000387 0.17415	0.0000152 0.0684
Blast Furnace B	3,900	0.0000387 0.15093	0.0000152 0.05928
Sintering	4,100	0.000116 0.4756	0.0000457 0.18737
Generally Applicable NPDES Permit Limitations (lbs/day)		0.80	0.32
Minimum Net Reduction 10%		0.08	0.03
Amount tradable to Outfall 002 Proposed 50% of allowable limitations for trade to Outfall 002		0.72 0.36	0.28 0.14
NPDES Permit Limits			
Alternative mass limitations (lbs/day)		**0.44**	**0.17**

Integrated Steel Making and Hot Forming (Outfall 002)			
BPT/BAT			
Operation	**Production (tons/day)**	**Total Zinc**	
		Maximum	**Average**
BOF Wet Open Comb.	8,500	0.0000279 0.24	0.0000159 0.14
Vacuum Degassing	6,800	0.0000209 0.14	0.0000119 0.08
Continuous Casting	8,450	0.00 0.24	0.00 0.13
Hot Strip Mill	8,375	0.000131 1.10	0.0000907 0.76
Generally Applicable NPDES Permit Limitations (lbs/day)		1.71	1.11
Amount traded from Outfall 001		0.36	0.14
NPDES Permit Limits			
Alternative mass limitations (lbs/day)		**2.07**	**1.25**

Table 15-6

List of Approved Test Procedures for Pollutants Regulated Under the Proposed Rule for the Iron and Steel Point Source Category

Parameter and Units	Method				
	EPA	**STD Method**	**ASTM**	**USGS**	**Other**
Conventional Pollutants					
Total suspended solids, mg/L (CAS C009), gravimetric, 103°-105°, post washing of residue	160.2	2540 D		I-3750-85	
Oil and grease, hexane extractable material (HEM), mg/L (CAS C036)	1664				
pH	150.1, 150.2	4500 H^+ B	D1293-95		
Nonconventional Pollutants					
2,3,7,8 TCDF (CAS 51207319)	1613 B				
Ammonia as nitrogen, mg/L (CAS 7664417)					
Manual distillation (at pH 9.5)[6]	350.2	4500-NH_3 B	D1426-93(A)	I-3520-85	973.49[3]
followed by nesslerization	350.2	4500-NH_3 C			973.49[3]
Titration	350.2	4500-NH_3 E	D1426-93(B)		
Electrode	350.3	4500-NH_3 F or G		I-4523-85	
Automated phenate or automated electrode	350.1	4500-NH_3 H			Note 7
Chlorine, total residual, mg/L (CAS 7782505)					
Amperometric direct	330.1	4500-Cl D	D1253-86(92)		
Iodometric direct	330.3	4500-Cl B			
Back titration ether end-point[15] or	330.2	4500-Cl C			
DPD-FAS	330.4	4500-Cl F			
Spectrophotometric, DPD or	330.5	4500-Cl G			
Electrode					Note 16
Fluoride, total, mg/L (CAS 16984488)					
Manual distillation followed by:		4500-F B			
Electrode, manual or	340.2	4500-F C	D1179-93(B)		
Automated				I-4327-85	
Colorimetric (SPADNS)	340.1	4500-F D	D1179-93(A)		
automated complexone	340.3	4500-F E			
Thiocyanate (CAS 302045)		4500-CN^- M			

Table 15-6 (Continued)

Parameter and Units	Method				
	EPA	STD Method	ASTM	USGS	Other
Priority Pollutants					
Chromium, total[4], mg/L (CAS 7440473) Digestion[4] followed by: AA direct aspiration[36] AA chelation-extraction AA furnace ICP/AES[36] DCP, [36] or Colorimetric (Diphenylcarbazide)	 218.1 218.3 218.2 200.7	 3111 B 3111 C 3113 B 3120 B 3500-Cr D	 D 1687-92(B) D1687-92(C) D4190-82(88)	 I-3236-85	 974.27[3] Note 34
Chromium VI dissolved, mg/L (CAS 18540299) 0.45 micron filtration followed by: AA chelation-extraction or Colorimetric (Diphenylcarbazide)	 218.4	 3111 C 3500-Cr D	 D1687-92(A)	 I-1232-85 I-1230-85	
Lead, total[4], mg/L (CAS 7439921) Digestion[4] followed by: AA direct aspiration AA furnace ICP/AES[36] DCP[36] Voltametry[11]or Colorimetric (Dithizone)	 239.1 239.2 [5]200.7	 3111 B or C 3113 B 3120 B 3500-Pb D	 D3559-90(A or B) D3559-90(D) D4190-82(88) D3559-90(C)	 I-3399-85	 974.27[3] Note 34
Mercury, total[4], mg/L (CAS 7439976) Cold vapor, manual or automated	 245.1 245.2	 3112 B	 D3223-91	 I-3462-85	 977.22[3]
Nickel, total[4], mg/L (CAS 7440020) Digestion[4] followed by: AA direct aspiration[36] AA furnace ICP/AES[36] DCP[36], or Colorimetric (heptoxime)	 249.1 249.2 [5]200.7	 3111 B or C 3113 B 3120 B 3500-Ni D	 D1886-90(A or B) D1886-90(C) D4190-82(88)	 I-3499-85	 Note 34
Selenium, total[4], mg/L (CAS 7782492) Digestion[4] followed by: AA furnace ICP/AES[36], or AA gaseous hydride	 270.2 [5]200.7	 3113 B 3120 B 3114 B	 D3859-93(B) D3859-93(A)	 I-3667-85	

Table 15-6 (Continued)

Parameter and Units	Method				
	EPA	**STD Method**	**ASTM**	**USGS**	**Other**
Priority Pollutants (continued)					
Zinc, total[4], mg/L (CAS 7440666) Digestion[4] followed by: AA direct aspiration[36] AA furnace ICP/AES[36] DCP,[36] or Colorimetric (Dithizone) or (Zincon)	 289.1 289.2 5200.7	 3111 B or C 3120 B 3500-Zn E 3500-Zn F	 D1691-90 (A or B) D4190-82(88)	 I-3900-85	 974.27[3], p.37[9] Note 34 Note 33
Cyanide, total, mg/L (CAS 57125) Manual distillation with $MgCl_2$ followed by Titrimetric or Spectrophotometric, manual or automated[20]	 [31]335.2 [31]335.3	 4500-CN C 4500-CN D 4500-CN E	 D2036-91(A) D2036-91(A)	 I-3300-85	 p.22[9]
Benzo-a-pyrene (CAS 50328) GC GC/MS HPLC	 610 625, 1625 610	6410 B, 6440 B	D4657-92		
Phenol (CAS 108952) GC GC/MS	 604 625, 1625	6420B, 6410B			
Naphthalene (CAS 91203) GC GC/MS HPLC	 610 625, 1625 610	6410 B, 6440 B			

See 40 CFR Part 136 for footnotes and note references.
CAS: Chemical Abstracts Service.